9-1270-223-10

This copy is a reprint which includes current pages from Change 1.

TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

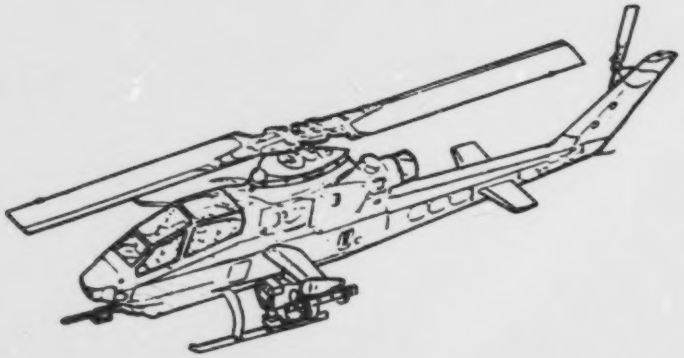
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM

(MILES)

SIMULATOR SYSTEM, FIRING, LASER: M80

AH-1S ATTACK HELICOPTER WEAPON SYSTEM

NSN 1270-01-165-6240



HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1984

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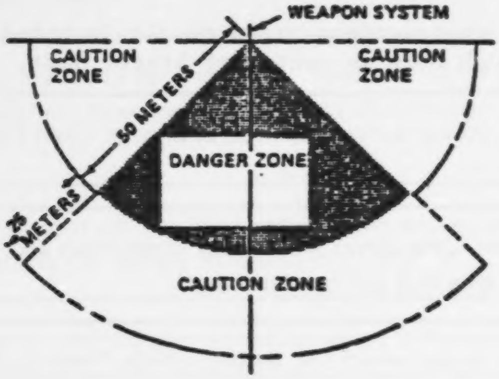
D 101.11:

WARNING

Insure that the area around the weapon is clear of other personnel to a distance of 50 meters. Allow at least 5 meters safety distance from equipment or vehicles. Damage to equipment may result if it is within the back blast area.

BACK BLAST DANGER ZONES



Always wear earplugs within 5 meters when firing the MILES AH-IS Attack Helicopter.

The radiated energy of laser light emitted by the Infantry System equipment is considered eye-safe by the United States Department of Health and Human Services (Regulation 21 CFR, Subchapter J, as applicable). Suitable precautions, however, must be taken to avoid overexposure to the laser light. While using the equipment, the following precautionary measures must be observed:

- Avoid viewing the laser emitter at close range (less than 12 meters). Increasing the eye-to-laser distance greatly reduces the risks of overexposure.
- Avoid viewing the laser emitter directly along the optical axis of the radiated beam.
- Avoid viewing the laser emitter directly along the optical axis of the beam through stabilized optics such as binoculars, telescopes, or periscopes at engagement ranges of less than 75 meters.
- While using the Controller Gun, NEVER aim it towards a person's eyes.

Insure that safe/arm shaft on ATWESS falls to safe position when breech is opened. Feel to make sure firing pin is not exposed when breech is opened.

Never arm the ATWESS until you are ready for a mission. Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause it to go off.

WARNING

Do not stand within danger zone while loading ATWESS.

Always stand on right side of rear of launcher.

After cartridge is inserted into chamber, keep hands, arms and other parts of body away from hole in center of breech door.

Failure to follow these instructions could result in being burned by blast pressure emissions escaping through hole in center of breech door.

Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Prior to apply Power to system, clear turret area of any obstruction and warn personnel to stand clear. Erect a Safety Barrier around area that gun barrels sweep.

If task requires Vehicle Power to be turned ON, ensure Vehicle Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

During System Checkout Tasks 1 and 2, ensure M18 Smoke Canister is NOT installed in Smoke Indicator. Ensure that the quick release pin is removed from the extractor. Failure to comply may result in Injury to Personnel.

Treat ATWESS cartridges as you would live ammunition. A sharp blow may set off the ATWESS cartridge.

Before initializing the MILES system. make sure all safety switches and arming levers are in their SAFE positions.

Do not preflight until all safety switches and arming levers are set to their SAFE positions.

M18 Smoke Canisters are the ONLY canisters authorized for use with the AKI Smoke Assembly. Care should be taken when handling expended canisters as they are initially hot to the touch. Failure to comply may result in Injury to Personnel.

Never arm an ATWESS until you are ready for a mission. Handle ATWESS cartridges with the same care you use with live ammunition. A sharp blow may set off ATWESS cartridge. Failure to comply may result in Injury to Personnel.

In inclement weather. you should shut off the AKI strobe to prevent experiencing vertigo during flight. AKI strobe is extinguished by turning CKI system POWER switch OFF.

Keep personnel clear of gun barrel. Moving gun may cause Injury to Personnel.

For information on FIRST AID. see FM 21-11.

TECHNICAL MANUAL
No. 9-1270-223-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., October 9, 1984

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M80
AH-1S ATTACK HELICOPTER WEAPON SYSTEM

NSN 1270-01-165-6240

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: AMSMC-MAS, Rock Island, IL 61299-6000. A reply will be furnished to you.

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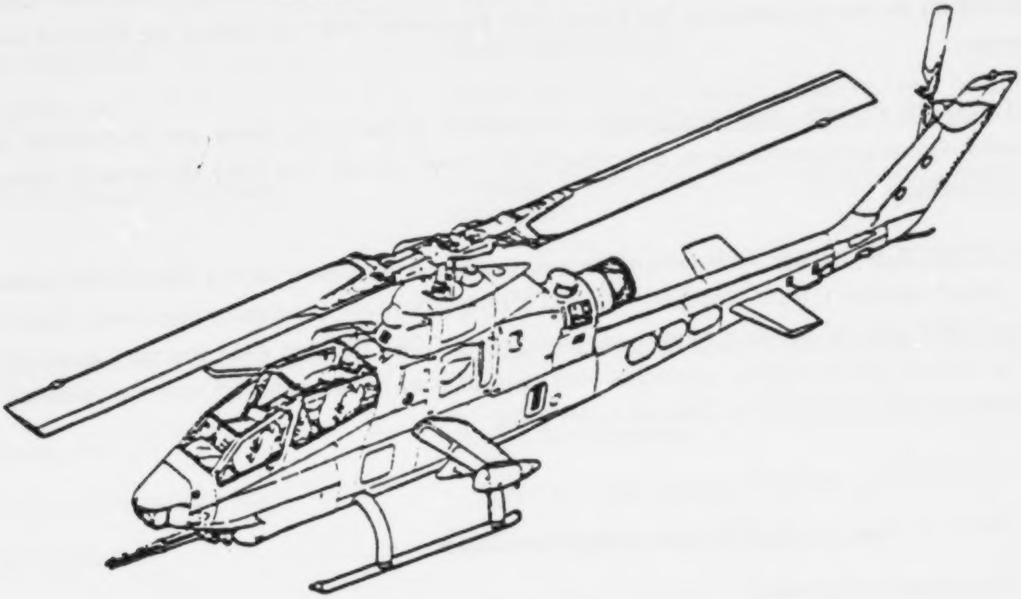
CHAPTER 1

INTRODUCTION

SECTION I. GENERAL INFORMATION



SCOPE

TYPE OF MANUAL. This Technical Manual shows you how to install, operate, and maintain Multiple Integrated Laser Engagement System (MILES)/Air-to-Ground Engagement System/Air Defense (AGES/AD) equipment for the AH-1S Attack Helicopter. Step-by-step instructions are given for all procedures necessary to use the MILES system.

This manual covers only authorized Operator maintenance. Any maintenance problems not covered should be referred to organizational ("0" Level) maintenance personnel.

NOTE

To use this Technical Manual you should be able to:

Energize and operate the AH-1S Attack Helicopter electronics.

Boresight, aim, and fire all AH-1S Attack Helicopter weapons in accordance with TM 55-1520-236-10.

Complete DA Forms 2402 and 2404.

If you are unable to do the above tasks, ask your NCOIC or Instructor to show you how and continue with this manual.

PURPOSE OF EQUIPMENT. MILES AGES/AD equipment for the AH-1S Attack Helicopter consists of three battery-operated laser transmitters and a detector system. It permits realistic combat training without the hazards of using live ammunition.

LIMITATION ON EQUIPMENT. MILES-equipped weapons have the same range and operational capabilities as the normal weapons, but a dirty laser transmitter lens may reduce the effective range of a transmitter.

MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance are those as prescribed in DA PAM 738-750, The Army Maintenance Management System (TAMMS).

HAND RECEIPT MANUAL. This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 9-1270-223-10-HR consists of preprinted Hand Receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2:

Commander

The U. S. Army Adjutant General Publications Center

2800 Eastern Boulevard

Baltimore, MD 21220

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS). If your MILES equipment for the AH-1S Attack Helicopter needs improvement, let us know. Send us an EIR. You, the User, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail the Quality Deficiency Report to us at Commander, U. S. Army Armament, Munitions and Chemical Command, ATTN: DRSMC-MAO(R), Rock Island, IL 61299. We'll send you a reply.

REFERENCE INFORMATION

This listing includes the Nomenclature Cross Reference List, List of Abbreviations, and an explanation of terms (Glossary) used in this manaul.

NOMENCLATURE CROSS REFERENCE LIST

Common Name	Official Nomenclature
Adapter Set	Adapter Set, Simulator System, Laser: For AH-1S Attack Helicopter
AH-1S Helicopter Simulator	Simulator System, Firing Laser: M80 for AH-1S Attack Helicopter
Aircraft Kill Indicator (AKI)	Indicator, Simulator System, Laser: Aircraft KILL/HIT/MISS
Aircraft Loaders Control Assembly	Adapter Assembly, Simulator System, Laser: Console (ALCA)
Battery Box	Battery Box Assembly
Cockpit Kill Indicator (CKI)	Adapter Assembly, Cockpit Kill Indicator
Controller Gun	Controller Gun, Simulator System, Laser
Detector Belt	Detector Belt Assembly, Aircraft Segment No. 1
FLASHWESS	Adapter Assembly, Simulator, Weapon Fire
Launch Rack Detector	Detector Assembly: TOW Launch Rack
Launch (ATWESS)	Launcher Assembly, Simulator System, Laser: Aircraft Weapon
Smoke Indicator	Indicator, Simulator System Laser: Smoke
TOW Programmer Control Panel	Control Panel, Simulator System, Laser: TOW Program Interrupt
TOW Transmitter	Transmitter Assembly, Simulator System, Laser: Airborne TOW
Trigger Test Interface (TTI)	Trigger Test Interface Assembly, Launcher
TSU-Alignment	Control Assembly, Simulator System, Laser: TOW-TSU Alignment
2.75 Transmitter	Transmitter Assembly, Simulator System, Laser: 2.75-Inch Rocket
20 mm Transmitter	Transmitter Assembly, Simulator System, Laser: 20 mm Cannon

LIST OF ABBREVIATIONS

AGES/AD	Air-to-Ground Engagement System/Air Defense
AH-1S	Attack Helicopter
AKI	Aircraft Kill Indicator
ALCA	Aircraft Loaders Control Assembly
ALT	Airborne Laser Tracker
APU	Auxiliary Power Unit
ATWESS	Antitank Weapons Effect Signature Simulator
CKI	Cockpit Kill Indicator
ECAS	Enhanced Cobra Armament System
IR	Infrared Radiation
MILES	Multiple Integrated Laser Engagement System
MRAD	Multiple Range Alignment Device
MWLD	Man Worn Laser Detector
PMCS	Preventive Maintenance Checks and Services
RMS	Rocket Management System
TCP	TOW Control Panel
TOW	Tube Launched, Optically Tracked, Wire Guided Missile System
TSU	Telescopic Sight Unit
TTI	Trigger Test Interface
WESS	Weapons Effect Signature Simulator

GLOSSARY

Aircraft Loaders Control Assembly	Receives detected laser pulse signals from detector belts. Decodes these signals and activates appropriate audio and visual alarms associated with the AKI/Smoke device and CKI. Contains programming for TOW/TSU transmitter.
Aircraft Kill Indicator (AKI)	Provides external flashing signal light which indicates that helicopter is under opposing fire ("NEAR MISS"), has been "HIT" or "KILLED." Attaches to left skid.

GLOSSARY (Continued)

ATWESS	Device installed in the rocket pod of AH-1S to provide simulated backblast, flash, noise, and smoke of a TOW firing.
ATWESS Cartridge	Pyrotechnic round used in ATWESS.
Cockpit Kill Indicator (CKI)	Contains electronic circuitry that activates AKI and intercom warning signals. Also contains a key receptacle for testing and activating system and an emergency system OFF switch. Located in cockpit.
Detector Assembly	Device which senses laser beams directed at it.
HIT	Simulated contact with opposing fire insufficient to disable vehicle or cause a fatality.
KILL	Simulated contact with opposing fire sufficient to disable vehicle or cause a fatality.
Laser	Light Amplification by Stimulated Emission of Radiation
Laser Beam	Invisible beam of light which simulates weapon fire.
Laser Detector Assembly	Device that senses laser beams directed at it.
Laser Transmitter	Device that sends the laser beam.
NEAR MISS	Simulated closeness to contact with opposing fire.
Simulator	Training device which takes the place of real equipment and which has many of its characteristics.
Smoke Indicator	Contains a smoke grenade that is ignited when the AH-1S has been "KILLED." Attaches to left skid adjacent to AKI.
Weapon Key	Used for the following: Reset/Initialize the 20 mm Interface, the CKI, and the 2.75-inch Rocket System. Resets and silences the alarm on the ALCA, and the MWLD. Selects the TOW Weapon System load lines.

SECTION II. EQUIPMENT DESCRIPTION

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

PURPOSE OF MILES SIMULATOR SYSTEM, LASER: AH-1S HELICOPTER

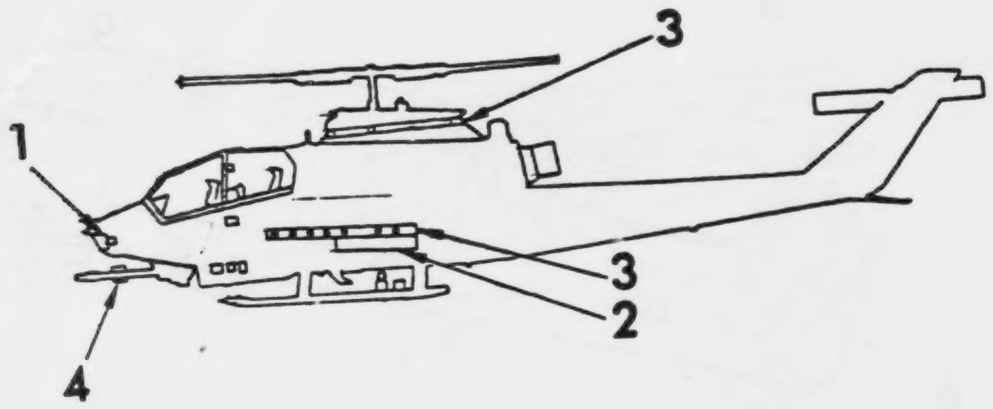
The MILES Simulator System, Laser: AH-1S Attack Helicopter, permits the helicopter and crew to take part in realistic combat training exercises. Actual firing conditions of all helicopter weaponry is simulated using laser beams. FLASHWESS and ATWESS devices add to the system's realism.

Laser detectors mounted on the AH-1S exterior sense enemy fire. MILES system electronics determines the accuracy and simulated damage of enemy fire. The system also detects the type of weapon directing enemy fire.

FEATURES AND CAPABILITIES

- Easily installed and removed.
- Simulates firing capability of AH-1S Attack Helicopter weapons.
  1. 2.75-inch Rocket Launcher
  2. TOW missile
  3. 20 mm Cannon
- FLASHWESS and ATWESS devices add realism.
- Normal firing procedures used for all weapons.
- Detects all opposing fire.
  1. Attacking weapon accuracy
     a. "NEAR MISS"
     b. "HIT"
     c. "KILL"
  2. Attacking weapon identification
- Uses eye safe battery-powered laser transmitters.
- Operates in temperatures from −35°C (−31°F) to 62°C (144°F).
- Compatible with all other MILES training devices.
- High visibility AKI strobe and smoke indicator light signals vehicle "NEAR MISS", "HIT" or "KILL."

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



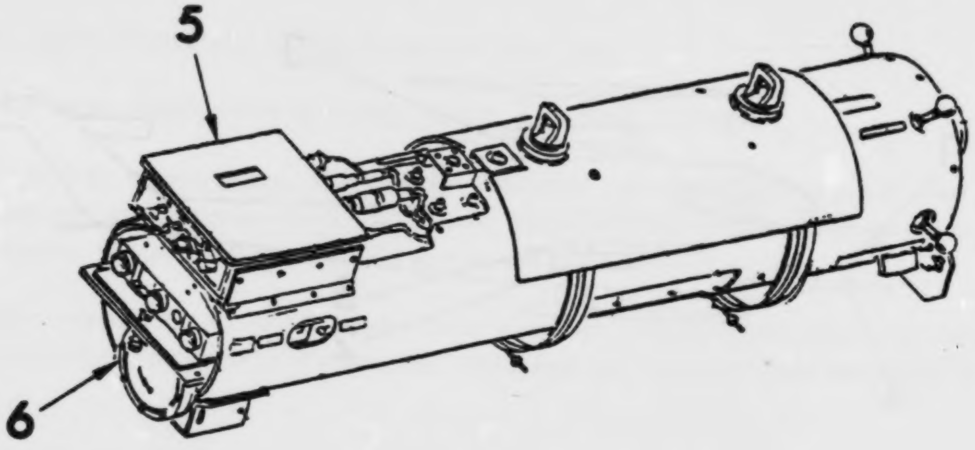
TOW/TSU Laser Transmitter (1). Simulates firing effects of the airborne TOW weapon by transmitting a special coded laser signal. Factory installed inside Telescopic Sight Unit (TSU) during aircraft assembly.

Antitank Weapons Effect Signature Simulator (ATWESS) (2). Provides flash, smoke, and noise to simulate the firing effects of the airborne TOW missile. Four ATWESS devices are located in each of the externally-mounted launchers.

Detection System (3). Receives laser pulses from MILES-equipped opposing weapons. Generates, amplifies, and routes electrical signals to the ALCA. Built-in microelectronics determine if the weapon that transmitted the signal can disable the AH-1S and whether the signal is a HIT, KILL, or NEAR MISS. Detectors are attached to the sail belt, TOW launch racks, and on bottom and rear of launchers.

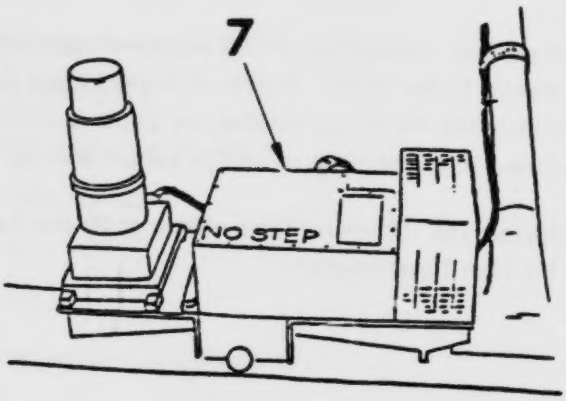
20 mm Cannon Laser Transmitter (4). Simulates firing effects of 20 mm Cannon by transmitting a coded laser signal. Located on the Chin Turret weapon.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

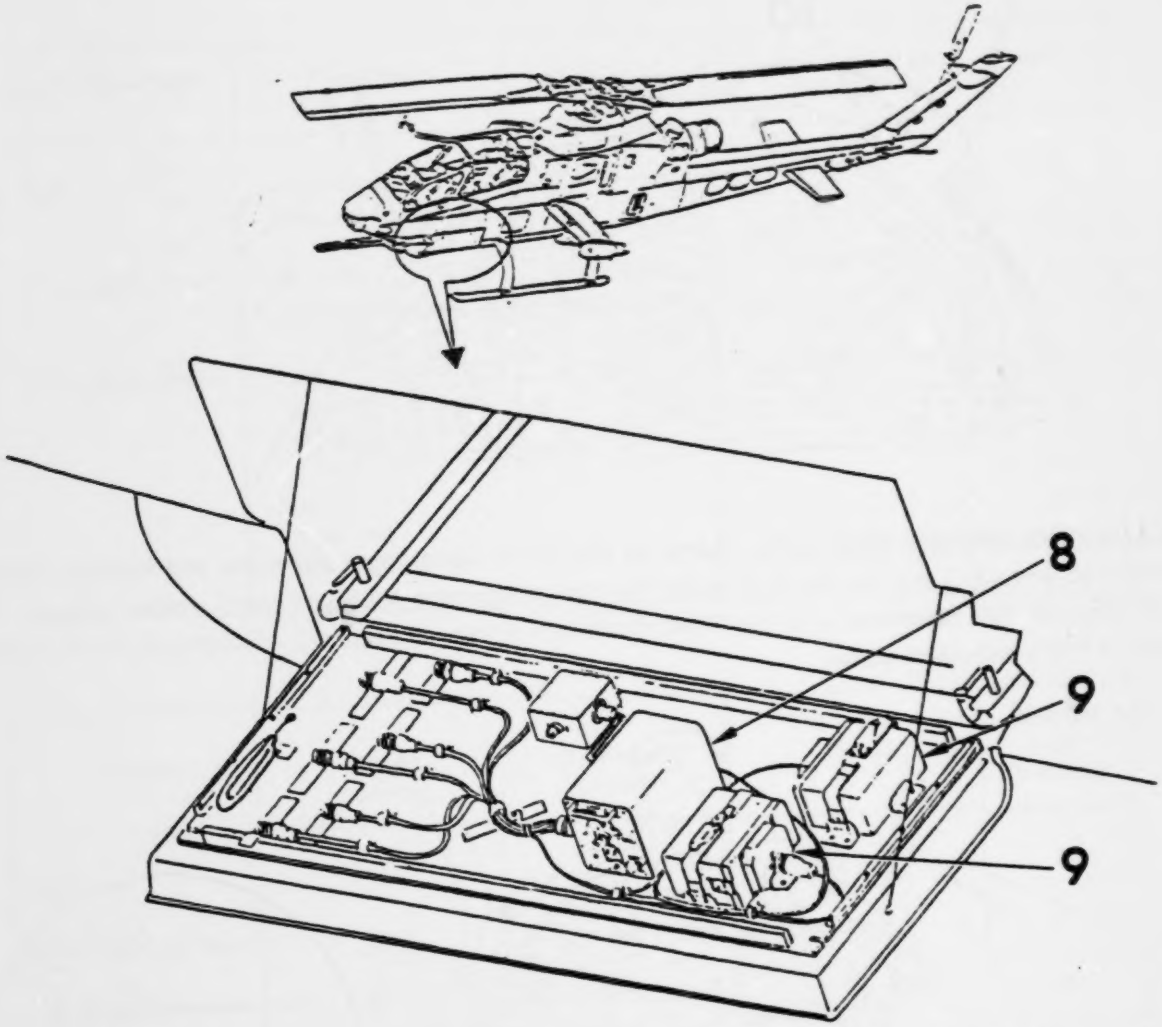


2.75-Inch Rocket Laser Transmitter (5). Simulates firing effects of the 2.75-inch rocket by transmitting a coded laser signal. One transmitter is located in each of the externally-mounted launchers.

Flash Weapons Effect Signature Simulator (FLASHWESS) (6). Simulates firing signature of the 2.75-inch rocket by means of a flashing light. One rocket FLASHWESS is located in each of the externally-mounted launchers. An additional FLASHWESS device mounts on the barrel of 20 mm Cannon. That unit simulates the flash of 20 mm fire.



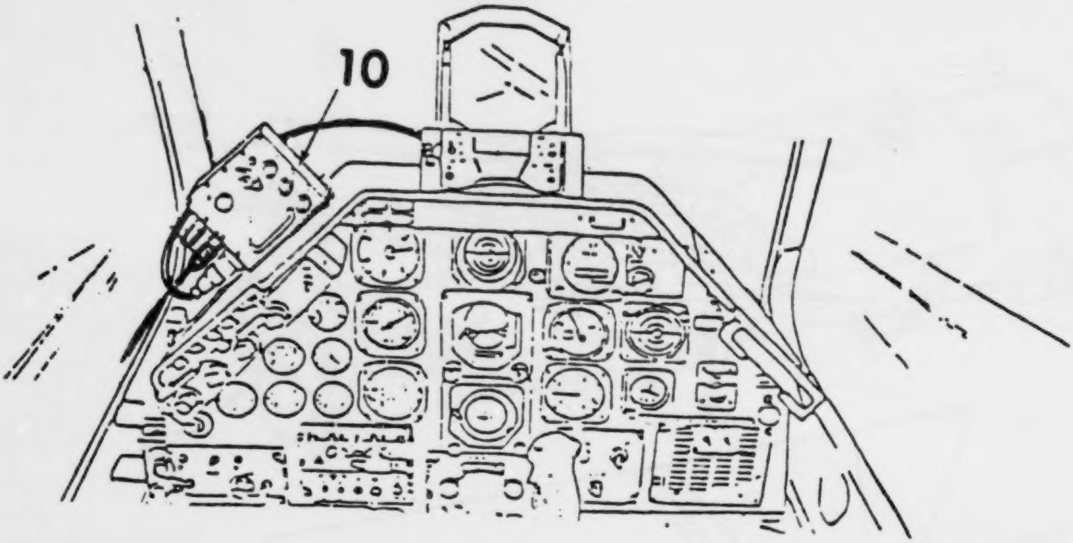
Aircraft Kill Indicator (AKI) and Smoke Indicator (7). Provides smoke to indicate an aircraft "KILL" and a flashing strobe light for a "KILL", "HIT", and "NEAR MISS" indication. Mounts on plate clamped to rear of left side helicopter skid.



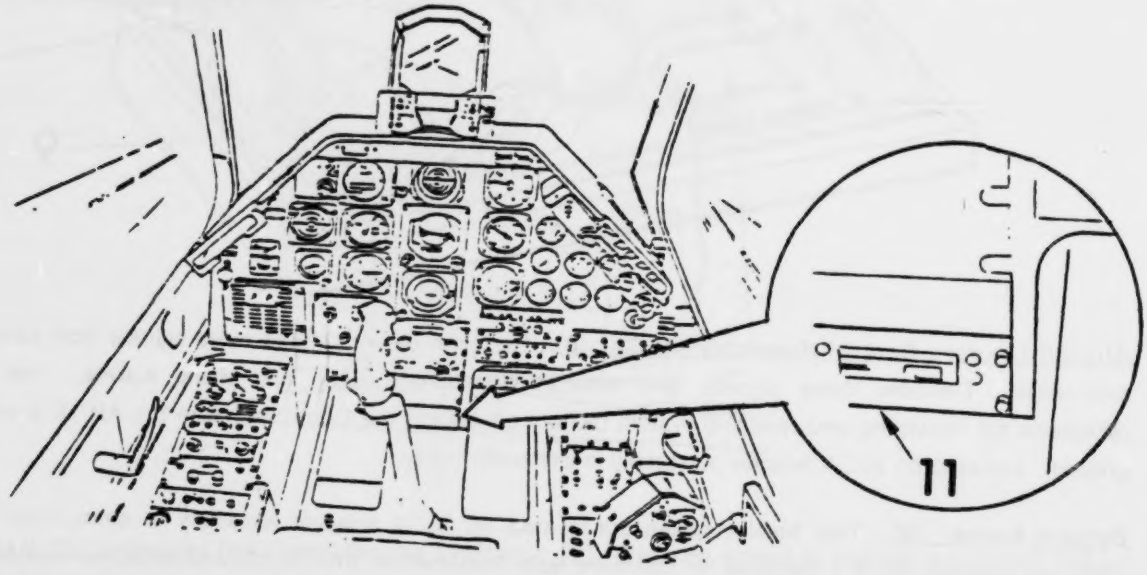
Aircraft Loaders Control Assembly (ALCA) (8). Receives detected laser pulse signals from detector assemblies. Decodes these signals, and actuates appropriate audio and visual alarms. Has key receptacle for initializing and resetting system (performed only by the Controller when the AH-1S is on the ground). Located on ALCA Adapter Assembly in ammunition bay.

Battery Boxes (9). Two battery boxes are located on ALCA Adapter Assembly in ammunition bay. Each box contains two 6 V batteries for operating laser transmitters, CKI, ALCA, and detection system.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)



Cockpit Kill Indicator (CKI) **(10)**. Alerts the Pilot by an audio (intercom) signal and indicator lights (ENGAGE and KILL) that the AH-1S is under fire from an opposing MILES-equipped weapon system. A CKI indicator light illuminates when the TOW missile is in a tracking sequence. Mounts on top left hand side of Pilot's instrument panel.



TOW Programmer Control Panel **(11)**. Provides simulated signals to AH-1S TOW programmer during TOW missile firings. Located in pilot's cockpit.

EQUIPMENT DATA

Table 1-1. AH-1S/MILES Technical Characteristics

Laser Transmitters	Firing Rate	Basic Load (Rounds)	Standard Kill Range (Meters)	Power
TOW	1 missile per 12 second Track Time	8	3750	12 V dc
20 mm Cannon	750 ± 60 rounds/minute	750 (20 mm) 600 (30 mm)	1500	12 V dc
2.75-Inch Rocket	Fast: 1 per 60 milliseconds Slow: 1 per 180 milliseconds	19	3000	12 V dc

Detector	Weight (pounds)	Dimensions (inches)	Power	Number of Detectors
Sail	4.3	234 x 2	12 V dc	8
TOW Detector Rack	17.7	84 x 8 (diameter)	12 V dc	7
Launcher Assembly	97	48 x 10 (diameter)	12 V dc	4

EQUIPMENT DATA (CONT)

Table 1-2. AH-1S/MILES Major Components Weights and Dimensions

Item	Weight (pounds)	Dimensions (inches)
20 mm Transmitter	11	6 x 14 x 11
FLASHWESS	4.5	5 x 5 (diameter)
Aircraft Loaders Control Assembly	9.5	6 x 5 x 9
Battery Box	1.3	7 x 5 x 4
Cockpit Kill Indicator	2	4 x 4 x 3
Sail Detector	4.5	234 x 2
TOW Detector Rack	17.7	84 x 8 (diameter)
Launcher Assembly	97	48 x 10 (diameter)
Smoke/AKI	23	21 x 12 x 7
TOW Transmitter	0.75	3 x 41.5
TOW Programmer Control Panel	1.4	5 x 35
2.75-Inch Rocket Transmitter	6	9.5 x 8.5 x 2

Table 1-3. MILES System Information for AH-1S Attack Helicopter Weights and Balances

MILES/AGES/AD Equipment	Weight (Pounds)	MOM X 100
Console Assembly with Batteries (AMMO Bay)	53.4	63.5
20 mm Transmitter	11	5.5
FLASHWESS 20 mm	4.5	2.2
Cable 20 mm	2	1.5
TOW Detector Racks (2) .7 = 35.4 2 x 17.7 = 35.4	35.4	65.7
CKI	2	2.3
AKI/Smoke	23	47.4
Sail Detector Belt # 1	4.3	8.9
TOW Detector Cables (2) 3 x 2 = 6	6	11.7
CKI Cable	2	1.9
ALCA TSU Cable	2	1.7
Remaining Cables	14	19.6
TOW Program Int.	1.4	1.6
Simulator Rocket Pods (2) 97 x 2 = 194	194	373.4
TOTALS	355	606.9

SECTION III. TECHNICAL PRINCIPLES OF OPERATION

BASIC PRINCIPLES OF OPERATION

The MILES system uses semiconductor laser beams to simulate actual weapon fire. An eye-safe invisible laser beam is sent out by each weapon's transmitter when it is fired. The laser beam is coded and simulates all of the weapon's capabilities including range, accuracy and destructive capability.

Laser detection systems are used to sense opposing fire. The detection systems detect opposing laser beams and determine whether they have scored a "NEAR MISS," "HIT," or "KILL". The systems activate alarms indicating the presence and damage of opposing fire.

The MILES system of laser beam transmitters and detectors allows safe realistic training exercises with a complete range of weaponry and vehicles.

MILES AH-1S ATTACK HELICOPTER CONFIGURATION

All weapons on the AH-1S Attack Helicopter are equipped with laser transmitters that are fired using normal weapon operating procedures. The helicopter exterior has special detectors and a detector belt attached that sense opposing fire. An Aircraft Loaders Control Assembly (ALCA) mounted inside the helicopter determines the extent of opposing fire and its effect.

A flashing light (AKI) mounted on the vehicle's exterior is activated by the control console when opposing fire is detected. A smoke indicator provides smoke to indicate that the AH-1S has been "KILLED."

20 mm CANNON MILES FIRING

The MILES-equipped 20 mm Cannon is fired using normal procedures. A FLASHWESS device is used to simulate the flash of the actual weapon.

The FLASHWESS mounts directly on the barrel of the 20 mm Cannon and will flash 120 times per minute when operating. This simulates the flash of actual live cannon fire.

A laser transmitter mounts on the cannon barrels. The actual aircraft 20 mm Cannon trigger fires the MILES laser transmitter.

The MILES system allows a basic load of 750–20 mm Cannon rounds. The laser rounds remaining will be displayed on the aircraft's Actual Rounds Remaining gauge.

On the ground, the MILES laser rounds remaining may be read directly as a display on the transmitter. The displayed number multiplied times 10 is the number of laser rounds remaining. This display is used for testing and troubleshooting the system. A key receptacle on the transmitter is used to reset it.

2.75-INCH ROCKET MILES FIRING

The MILES-equipped 2.75 Rocket System is fired using normal procedures. A MILES launcher assembly is installed in the rocket pods in place of the actual rocket system. A FLASHWESS device which flashes 120 times per minute simulates the light given off during live rocket firing. The simulated rockets may be fired at a HIGH (1 per 60 milliseconds) to LOW (1 per 180 milliseconds) rate. The laser and FLASHWESS are triggered by firing signals from the AH-1S.

The MILES system allows a load of 19 simulated 2.75-inch rocket laser rounds. The Rounds Remaining Count will be displayed on the aircraft's Rocket Management System (RMS) gauge. The laser rounds remaining may also be read on a display on the launcher assembly. This display may be used for testing and troubleshooting the system.

A key on the TTI resets the rocket transmitter.

MILES TOW FIRING

The MILES-equipped AH-1S TOW Launcher System is fired using normal weapon procedures. A laser transmitter which simulates the firing effects of the airborne TOW weapon is factory installed inside the Telescopic Sight Unit (TSU) mounted near the AH-1S nose. It fires a coded laser signal which simulates the range and accuracy of an actual TOW missile.

The TOW transmitter utilizes 12 V dc electrical power provided from batteries inserted in a MILES system battery box. A maximum of 8 TOW laser rounds may be fired. After firing the TOW transmitter you can check to see how many rounds the MILES system has left. This is done on the ground, by turning the ROUNDS REMAINING switch on the ALCA to MISSILE, pressing the display button, and reading the displayed number; or in the aircraft, by visually checking the TOW missile panel status. That number represents the rounds remaining.

Four ATWESS devices are contained in each launcher assembly. These simulate the noise, smoke and flash of actual TOW missile launches. The ATWESS devices utilize pyrotechnic ATWESS cartridges to create these effects.

A tracking time of 12 seconds is required for each TOW laser firing. This simulates actual firing conditions.

DRY FIRE (TEST) OPERATION

All MILES transmitters may be fired without the noise or flash simulator normally used with the weapon simulator. This is called the Dry-Fire (test) mode. The Dry-Fire (test) mode is used only for testing and aligning the MILES equipment.

A rotary switch on the Trigger Test Interface Panel controls use of the ATWESS device with the TOW transmitter.

A PUSH TO TEST button on the 20 mm laser transmitter fires the 20 mm Cannon without the FLASHWESS.

HELICOPTER DETECTION SYSTEM

A sail detector belt containing 8 detectors is mounted on the fuselage of the AH-1S. Additional detectors are also mounted on the TOW Launch Rack Detector Assemblies and the Launcher Assemblies.

Opposing laser fire is detected by the detectors. They generate electrical signals which are fed to a decoder in the Aircraft Loaders Control Assembly (ALCA).

The decoder identifies the type of weapon that fired the opposing laser beam. It determines whether the laser shot was accurate enough to cause a "HIT" or whether a "NEAR MISS" occurred. The "ENGAGE" light on the CKI comes on for both a "HIT" and a "NEAR MISS." It also determines if the weapon was capable of causing damage to the target (an M16 rifle, for example, cannot disable a tank) and the probability of "KILL" for that weapon. The probability of "KILLING" a target is different for each attacking weapon.

If a detector on the AH-1S is hit by laser fire, one of three things will happen:

1. Two tones will sound in the vehicle intercom and AKI light mounted on the helicopter exterior will flash two times. The ENGAGE lamp on the CKI will come on. This means a "NEAR MISS" occurred.
2. Four to six tones will sound in the intercom and AKI light will flash four or six times. The ENGAGE lamp on the CKI will come on. This means a "HIT" but not a "KILL" occurred.
3. The intercom tone will sound continuously and AKI light will flash continuously. A M18 smoke grenade in the smoke indicator assembly mounted on the helicopter skid will explode. The KILL lamp on the CKI will come on. This means a "KILL" occurred.

After landing the AH-1S crew can determine what type of weapon has fired on them by setting the switch on the MILES ALCA to HIT/KILL and pushing the display button. A code number will appear on the display indicating the attacking weapon following a "HIT" or "KILL." No code number appears for a "NEAR MISS."

The intercom tone can be silenced after a "KILL" by turning the VOLUME knob on the Cockpit Kill Indicator (CKI). The CKI light continues to flash until reset by a Controller after the AH-1S lands.

CHAPTER 2

OPERATING INSTRUCTIONS

SCOPE. This Chapter provides those instructions needed by the aircraft crew to install, test, align, operate, and remove MILES AH-1S Attack Helicopter equipment.

SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

MILES/AH-1S CONTROLS AND INDICATORS. MILES/AH-1S Controls and Indicators are provided on the Cockpit Kill Indicator (CKI), Aircraft Loaders Control Assembly (ALCA), Trigger/Test Interface, and 20 mm Interface. All other controls and indicators, such as triggers, arming switches, and rounds remaining indicators are those actually associated with the AH-1S weapons.

20 mm INTERFACE. Controls and Indicators for the 20 mm Interface are listed in Table 2-1.

Table 2-1. 20 mm Interface Controls and Indicators

Key	Description	Function	Operating Position
1	PUSH TO TEST	Fires 20 mm Cannon.	Press to fire transmitter.
2	CONTROLLER	Resets/initializes system.	Insert and turn Controller Key to reset system (Performed only by Controller).
3	PUSH TO READ	Activates display.	Press to read laser rounds remaining.
4	ROUND COUNT X 10	Displays numbers.	Normally blank.
5	TRIGGER	Flashes ON/OFF.	ON when aircraft trigger being used.
6	RND CNTR	Flashes ON/OFF.	ON when PUSH TO TEST or aircraft trigger being used.

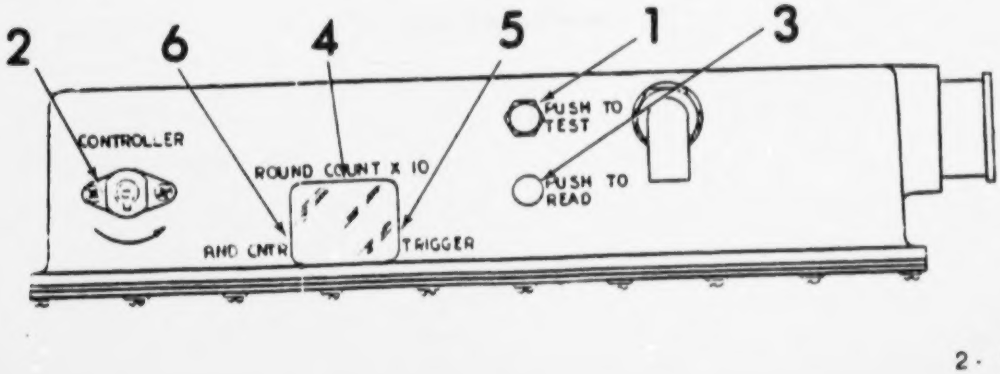
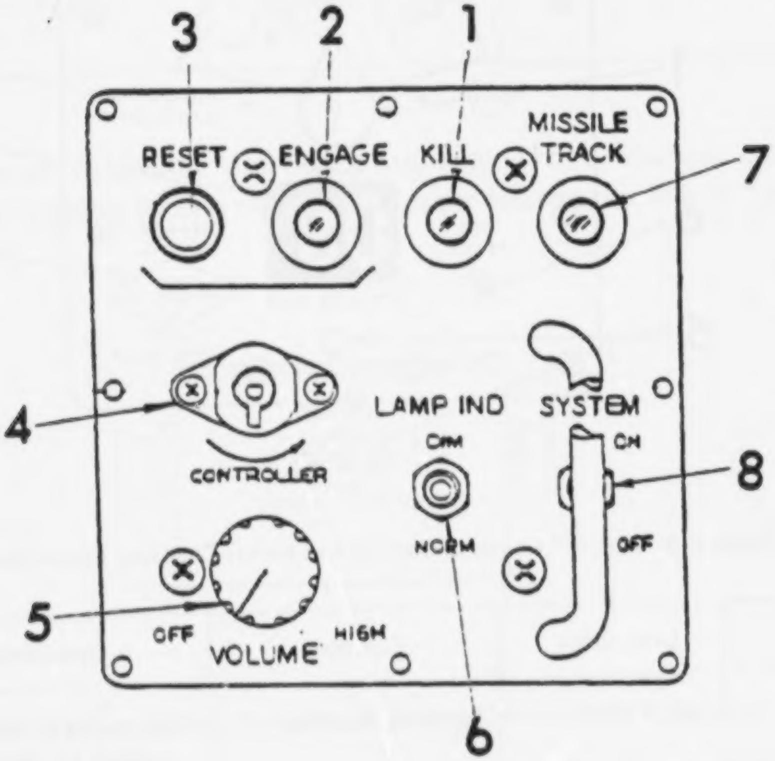


Table 2-2. Cockpit Kill Indicator Controls and Indicators

Key	Description	Function	Operating Position
1	KILL	Lights blue when detection system receives a "KILL."	Adjustable iris normally open. DIM when using night vision goggles.
2	ENGAGE	Lights amber when detection system receives a "HIT" or "NEAR MISS."	Adjustable iris normally open. DIM when using night vision goggles.
3	RESET	Resets ENGAGE light.	
4	CONTROLLER	Resets/Initializes system.	Controller Key to CONTROLLER resets system.
5	VOLUME	Adjusts loudness of MILES tone in intercom.	As required.
6	LAMP IND	Changes brightness of CKI lamps.	NORM - during daylight operations. DIM - during night operations.
7	MISSILE TRACK	Lights clear when TOW missile is in a tracking sequence.	Adjustable iris normally open. DIM when using night vision goggles.
8	SYSTEM	Turns off MILES system in case of emergency.	ON

COCKPIT KILL INDICATOR (CKI) CONTROLS AND INDICATORS. Controls and indicators for the CKI are listed in Table 2-2.


3
2
1
RESET
ENGAGE
KILL
MISSILE TRACK
7
4
CONTROLLER
LAMP IND
ON
NORM
SYSTEM
ON
OFF
8
5
OFF
VOLUME
HIGH
6

CKI Front Panel

AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) CONTROLS AND INDICATORS. Controls and indicators for the ALCA (located on the ALCA Adapter Assembly) are listed in Table 2-3.

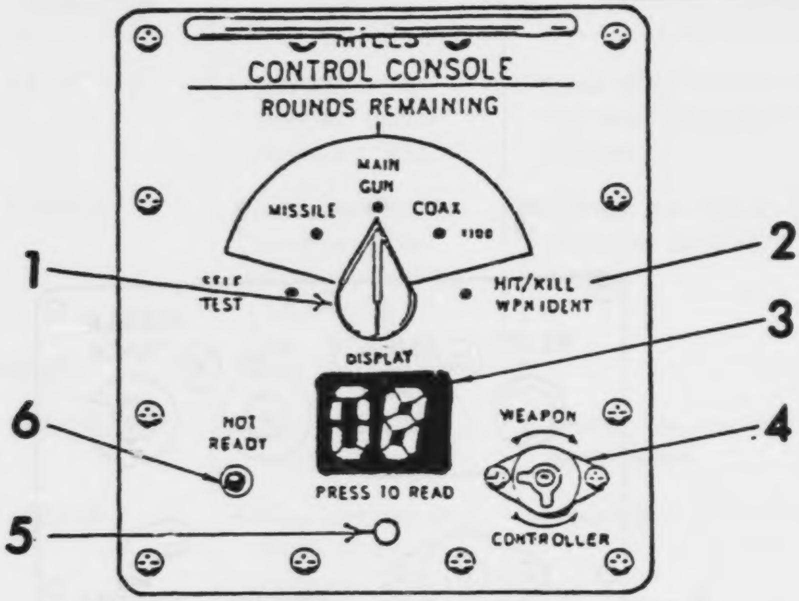

MILES
CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
x100
SELF TEST
HIT/KILL WPN IDENT
DISPLAY
NOT READY
PRESS TO READ
WEAPON
CONTROLLER
1
2
3
4
5
6

Table 2-3. Aircraft Loaders Control Assembly Controls and Indicators

Key	Description	Function	Operating Position
1	SELF TEST	Performs Self Test.	Turn to SELF TEST. Press PRESS TO READ. Display should read 88.
2	HIT/KILL WPN IDENT	Identifies weapon firing on you.	Turn to HIT/KILL. Press PRESS TO READ. Display will show a number.
3	DISPLAY	Displays numbers.	
4	WEAPON/ CONTROLLER	Resets and silences alarm.	Turn Controller Key to CONTROLLER position to reset system. (Performed only by Controller.)

Key	Description	Function	Operating Position
5	PRESS TO READ	Activates display.	Press to activate display.
6	NOT READY	Lights when not ready, "KILLED", or missile tracking.	

CONSTRAINT OVERRIDE ASSEMBLY CONTROLS AND INDICATORS. Controls and Indicators for the Constraint Override Assembly (located on the ALCA Adapter Assembly) are listed in Table 2-4.

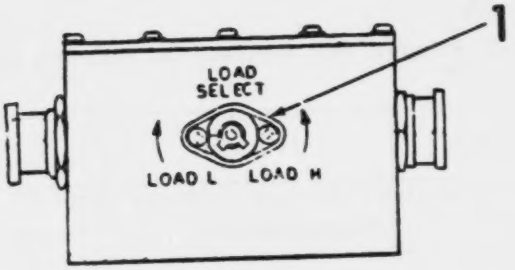


Table 2-4. Constraint Override Assembly Controls and Indicators

Key	Description	Function	Operating Position
1	LOAD SELECT	Selects TOW Transmitter Load Lines.	Either LOAD L or LOAD H using Controller key.

TRIGGER/TEST INTERFACE CONTROLS AND INDICATORS. Controls and indicators for the TTI are listed in Table 2-5.

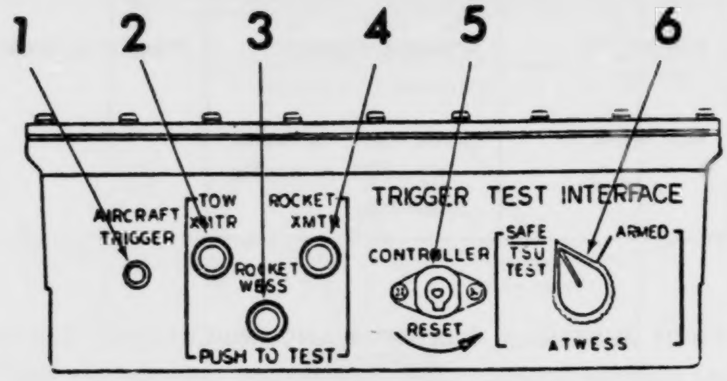
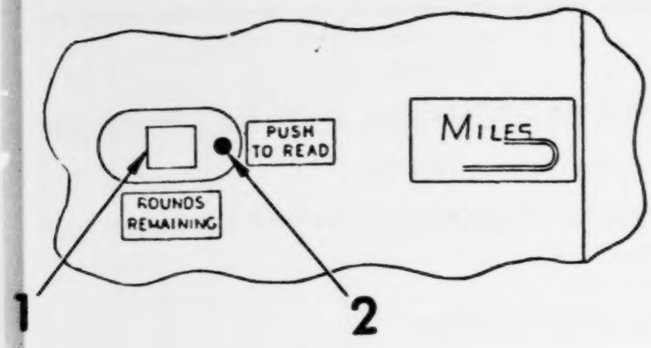

1
2
3
4
5
6
AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
TRIGGER TEST INTERFACE
CONTROLLER
RESET
SAFE
TSU TEST
ARMED
ATWESS

Table 2-5. Trigger/Test Interface Controls and Indicators

Key	Description	Function	Operating Position
1	AIRCRAFT TRIGGER	Flashes ON/OFF.	Flashes when aircraft trigger used.
2	TOW XMTR	Fires TOW transmitter.	Press to fire transmitter.
3	ROCKET WESS	Fires FLASHWESS.	Press to fire FLASHWESS.
4	ROCKET XMTR	Fires 2.75-inch Rocket.	Press to fire transmitter.
5	CONTROLLER/ RESET	Resets/Initializes 2.75-inch Rocket System.	Turn Controller Key to Reset or to Initialize system. (Performed only by Controller.)
6	ATWESS	Arms/Disarms ATWESS.	Armed.

LAUNCHER CONTROLS AND INDICATORS. Controls and indicators for the 2.75-inch Launcher Assembly are listed in Table 2-6.


ROUNDS REMAINING
PUSH TO READ
MILES
1
2

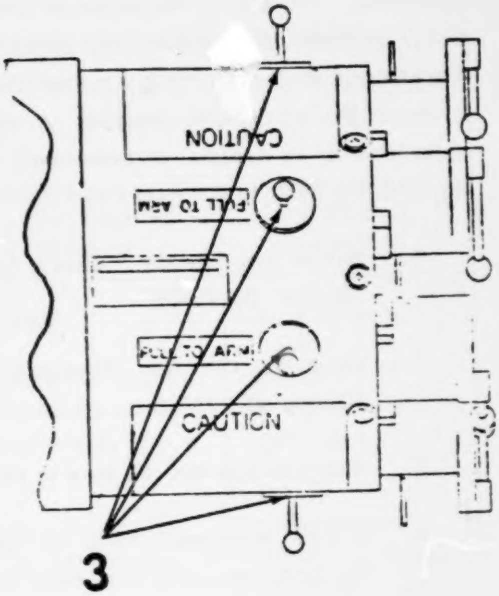

CAUTION
PULL TO ARM
PULL TO ARM
CAUTION
3

Table 2-6. 2.75-Inch Launcher Assembly Controls and Indicators

Key	Description	Function	Operating Position
1	ROUNDS REMAINING	Displays numbers.	Normally blank.
2	PUSH TO READ	Activates display.	Press to read laser rounds remaining.
3	PULL TO ARM	Arms ATWESS.	Armed.

SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

GENERAL. Preventive Maintenance Checks and Services will ensure that the MILES equipment will always be ready for operation and perform satisfactorily throughout its mission. Preventive maintenance checks consists of performing a systematic inspection to discover defects before they result in operational failure of the equipment. Defects or malfunctions discovered by the crew during use of the MILES equipment, or as a result of performing maintenance checks and services, will be reported using the proper forms (refer to DA PAM 738-750).

1. Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your "Before" (B) PMCS.
2. While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your "During" (D) PMCS.
3. After you operate. Be sure to perform your "After" (A) PMCS.
4. If your equipment fails to operate, troubleshoot with proper equipment. Report any discrepancies using the proper forms (see DA PAM 738-750).

Table 2-7. Operator/Crew Preventive Maintenance Checks and Services

NOTE

Within designated interval, these checks are to be performed in the order listed.

B – Before Operation	D – During Operation	A – After Operation	W – Weekly Operation	M – Monthly Operation

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
1	•					Batteries	Inspect for acid leaks.	Acid is present.
2	•		•			Battery Boxes	Inspect for damaged connectors. Check that connectors and interior battery contacts are serviceable.	Damage would prevent normal operation.
3	•		•			Cable Assemblies	Inspect for broken connectors and cut, worn or bare wires.	Connectors are broken or wiring is cut and bare.
4	•		•			ALCA	Inspect for cracks in display window.	Display window is cracked.
							Check that Controller Key turns freely in Controller Key receptacle.	Controller Key does not turn freely.
							Inspect for evidence of switch damage.	Switch is damaged.
5	•		•			Belt Segment and detector assemblies	Look for loose or cracked detectors or damaged connectors.	Detectors are loose or cracked; connectors are damaged.
6	•		•			AKI/Smoke	Inspect for cracks in plastic lens.	Lens is cracked.
							Inspect for damaged receptacle.	Receptacle is damaged.
							Inspect for stripped mounting bracket threads.	Cannot be securely mounted .
							Inspect for damaged hinge and latch.	Hinge or latch is damaged
	•		•				Inspect for presence of grenade.	Grenade is present.

Table 2-7. Operator/Crew Preventive Maintenance Checks and Services (Cont)

NOTE

Within designated interval, these checks are to be performed in the order listed.

B - Before Operation   D - During Operation   A - After Operation   W - Weekly Operation   M - Monthly Operation

Item No.	Interval					Item to be Inspected	Procedures - Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	B	D	A	W	M			
7	•		•			CKI	Inspect for evidence of switch damage.	Switch is damaged.
							Inspect lamps for proper operation.	Lamps do not illuminate.
							(If lamps fail to illuminate, unscrew Iris Assembly, clean unit out, and retest.)	
							Check that Controller Key turns freely in Controller Key receptacle.	Controller Key does not turn freely.
8	•					ATWESS	Check each ATWESS Breech Block for positive operation without binding.	Breech Block binds.
9	•					ATWESS Cartridge	Inspect for cracks in cartridge case, dented primer, tears or punctures in copper disc. (Replace any damaged cartridges in accordance with local EOD procedures.)	Cartridge case is cracked, primer is dented, copper disc is torn or punctured.
10	•		•			Transmitters (2)	Inspect lenses for dirt or damage. Check connectors for damage.	Lens or connectors are damaged.
11	•		•			FLASHWESS	Inspect lens for dirt or damage. Check connector and pins for damage.	Lens or connectors are damaged.
12	•		•			Trigger/Test Interface	Inspect switches and receptacles for damage.	One or more switches damaged.
13	•		•			TOW Programmer Control	Inspect connectors and pins for damage.	Connectors are damaged.

SECTION III. OPERATION UNDER USUAL CONDITIONS

GENERAL. Before the MILES equipment can be used, it must be properly installed on the AH-1S Attack Helicopter. To speed up procedures, work is organized into various tasks. While some crew members are performing one set of tasks, others can be performing another set.

Before you begin, **READ ALL STEPS IN THE TASK AND LOOK AT EACH ILLUSTRATION CAREFULLY**. To help perform a task, most steps have reference numbers to illustrations. Do each step just the way you are instructed and in the order in which it occurs in this manual.

NOTE

Don't jump ahead. Don't skip any steps.

If your MILES equipment has a problem you can't fix using this manual, report it on DA Form 2404. To get a replacement, turn in the faulty equipment and the completed form.

TASK ASSIGNMENT. The Crew Chief assigns crewmen to tasks. The crewman turns to the appropriate section in this manual and performs the required steps IN ORDER. Occasionally, the manual may tell a crewman to wait until he has made sure that another crewman has completed an earlier task. On some tasks, two crewmen may have to work together.

START AT TASK 1 AFTER READING THE TASK ASSIGNMENT.

Certain steps must be done with the Controller present. A Controller Key, carried only by the Controller, is required to reset the system. The Crew Chief will determine when to call the Controller.

Those tasks involving the Controller must be done in this order.

1. Alignment Task 1 (See page 2-99)
2. System Checkout Test Tasks 1 through 5 (See pages 2-118 through 2-130)
3. Operational Tasks 1 (Initializing MILES System), 6 (Recognizing Enemy Fire), and 7 (Resetting System After a "Kill") (See pages 2-133, 2-146 and 2-148)

The Crew Chief should coordinate the tasks, give assistance to any crewman who needs it, and check to make sure everything gets done.

NOTE

Unless otherwise indicated, in this manual references to right and left sides of the AH-1S Attack Helicopter use the seated Pilot as a standard.

LIST OF TASKS

Tasks **Page**

Assembly and Preparation for Use

Preinstallation Task 2-12
Inside Installation Tasks 2-13
Inside Cable Installation Tasks 2-20
Outside Installation Tasks 2-31
Outside Cable Installation Tasks 2-58

Initial Adjustments, Daily Checks and Self Test

Alignment Tasks 2-98
System Checkout Tasks 2-117

Operating Procedure

Operational Tasks 2-132
Postoperational Tasks 2-149

NOTE

Perform these tasks in the order given.

Insure any screws or other hardware removed from AH-1S are stored is secure place for replacement at end of MILES training exercise.

ASSEMBLY AND PREPARATION FOR USE

Preinstallation Task.

Obtain all equipment needed to install and operate MILES AH-1S Attack Helicopter system from your NCOIC. Unpack 4 transit cases. Verify that all equipment is present and not visibly damaged. Check against illustrations in Appendix B, Components of End Item.

Obtain all Expendable/Durable Supplies and Materials (Appendix D), and Additional Authorized Items (Appendix C).

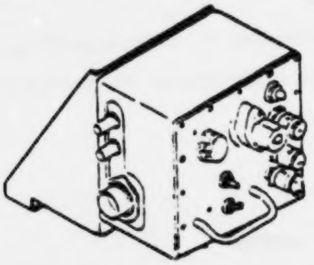
Obtain ATWESS cartridges.

INSIDE INSTALLATION TASKS - LIST

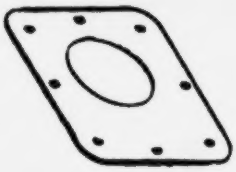
Task	Title	Page
1.	Obtain Equipment	2-13
2.	Inspect Cockpit Kill Indicator Assembly (CKI)	2-14
3.	Install Cockpit Kill Indicator Assembly (CKI) on AH-1S (MC), (ECAS) and (PROD)	2-15
4.	Install Cockpit Kill Indicator Assembly (CKI) on AH-1S (MOD)	2-16
5.	Inspect TOW Program Interrupt Control Panel	2-16.1
6.	Install TOW Program Interrupt Control Panel on AH-1S (MC) and (ECAS)	2-17
7.	Install TOW Program Interrupt Control Panel on AH-1S (MOD)	2-18
8.	Install TOW Program Interrupt Control Panel on AH-1S (PROD)	2-18.1
9.	Inspect Floor Plate	2-18.2
10.	Install Floor Plate	2-19

Inside Installation Task 1: Obtain Equipment. Completion of Inside Installation Tasks require equipment listed and illustrated below. Locate and set aside this equipment.

1 Cockpit Kill Indicator Assembly (CKI)

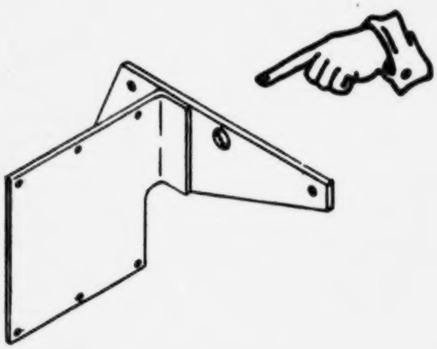


1 Floor Plate

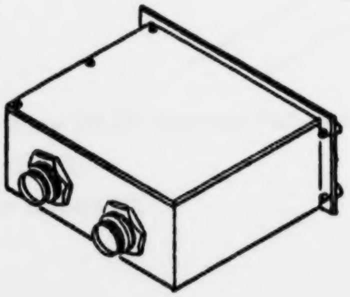


3 MILES Supplied Pan Head Screws (Item 5S, Appendix B)

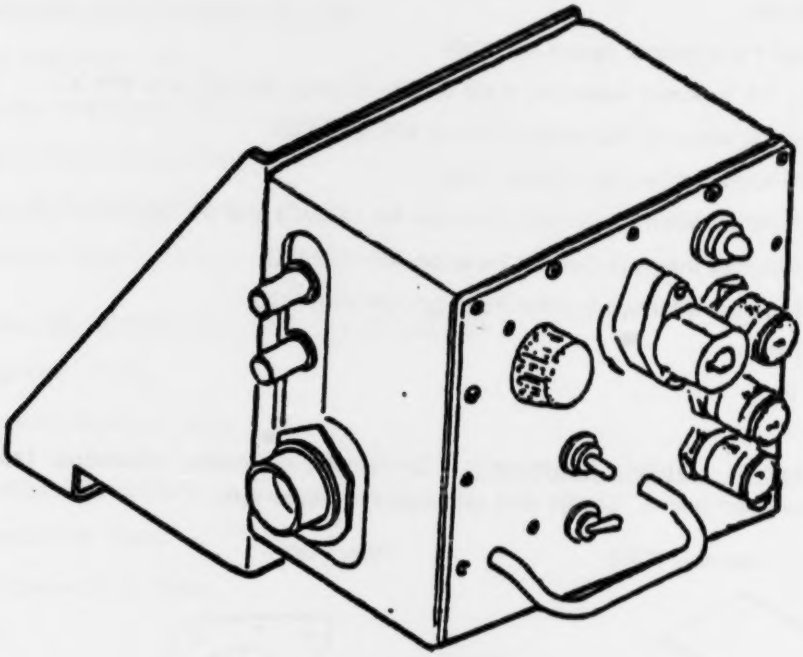
1 Bracket, Cockpit Kill Indicator (CKI)



1 TOW Program Interrupt Control Panel



Inside Installation Task 2: Inspect Cockpit Kill Indicator Assembly (CKI).

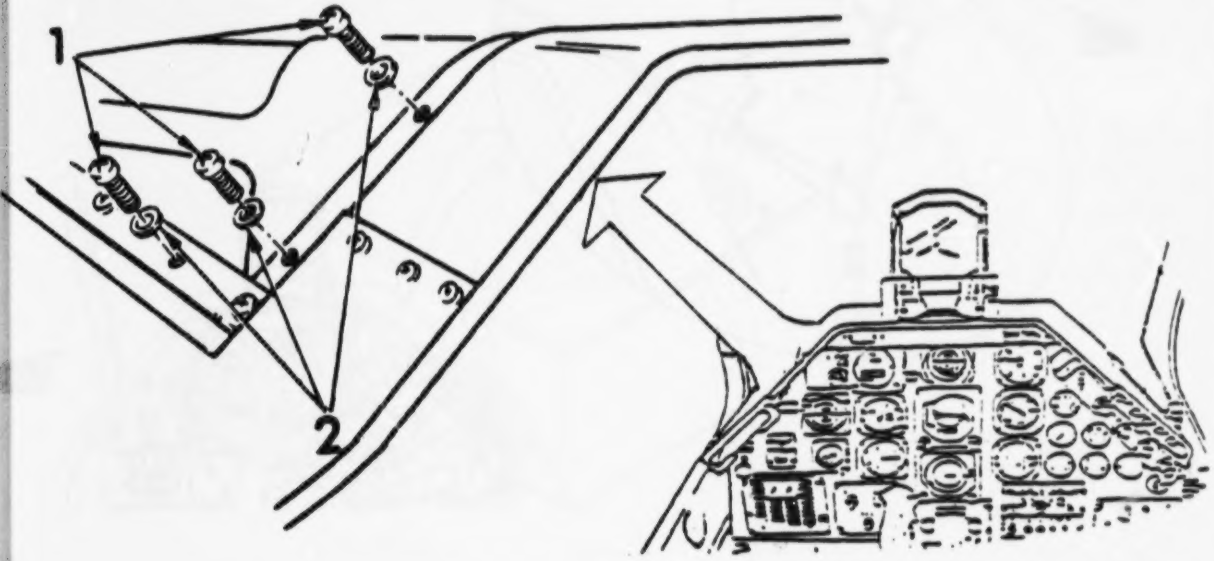


Inspect CKI assembly for any damage that would make it not usable.

Report any damage on DA Form 2404. Replace equipment only if not usable.

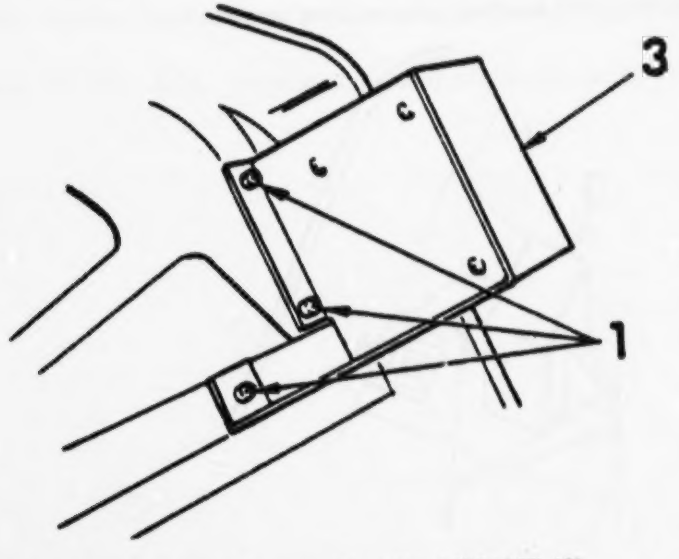
Inside Installation Task 3: Install Cockpit Kill Indicator Assembly (CKI) on AH-1S (MC), (ECAS), and (PROD).

NOTE: Omit this task if CKI is to be installed on AH-1S (MOD).



Remove three screws (1) and three washers (2) from top left hand side of Pilot's instrument panel.

Retain screws for reinstallation following MILES exercises.

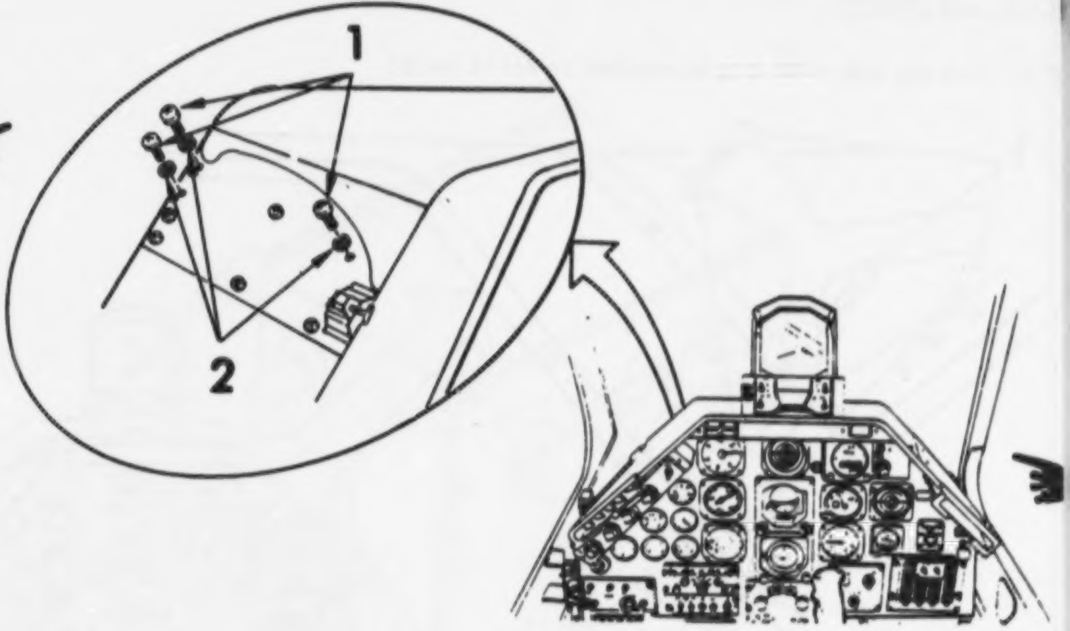


Install three MILES Supplied Pan Head Screws (Part No. MS51957-46).

Install CKI (3).

Tighten screws (1).

Inside Installation Task 4: Install Cockpit Kill Indicator Assembly (CKI) on AH-1S (MOD).

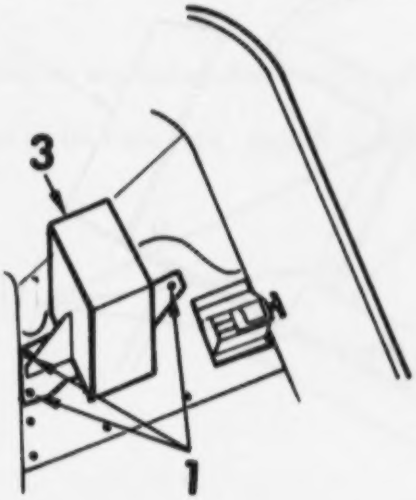


Remove three screws (1) and three washers (2) from top left hand side of Pilot's instrument panel.

Retain screws for reinstallation following MILES exercises.

Remove CKI from bracket.

Install CKI on AH-1S (MOD) bracket using existing screws.

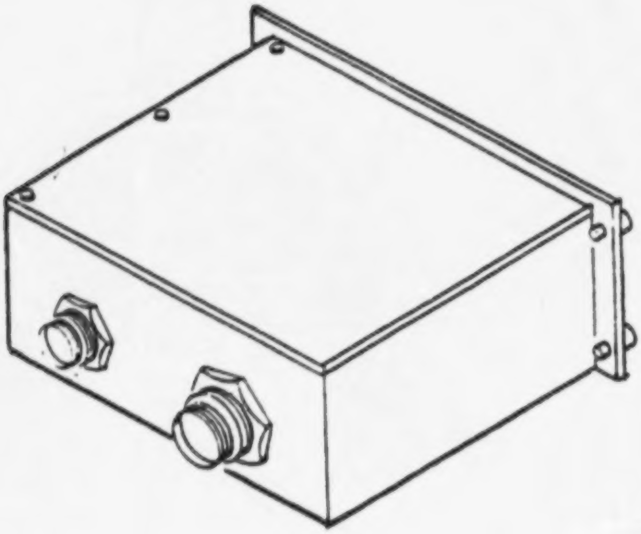


Install three MILES Supplied Pan Head Screws (Part No. MS51957-46).

Install CKI (3).

Tighten screws (1).

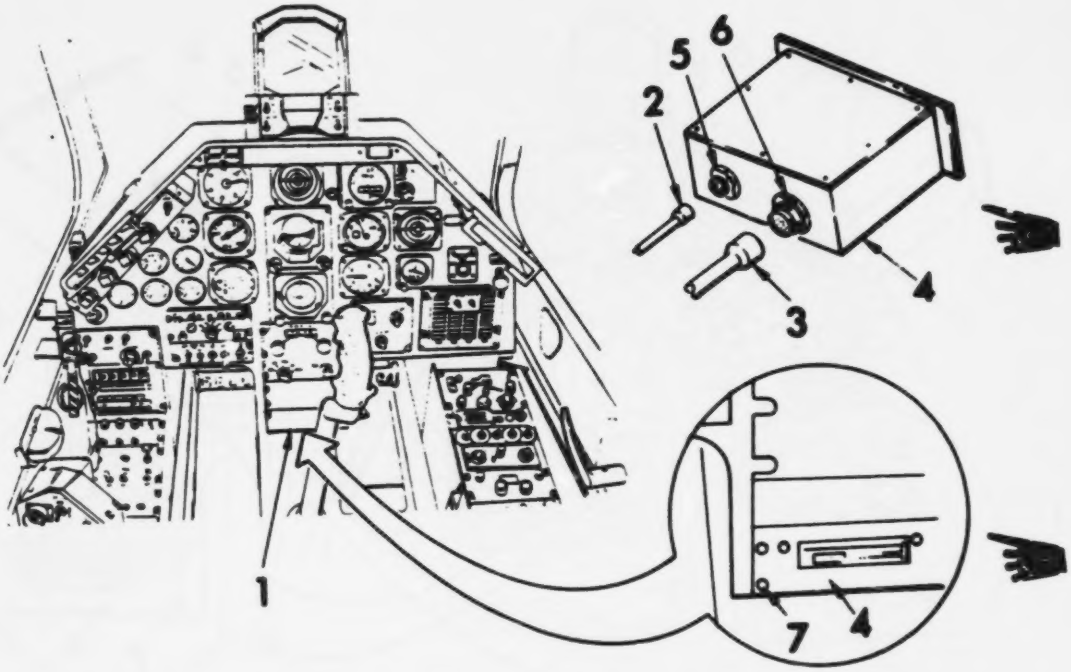
Inside Installation Task 5: Inspect TOW Program Interrupt Control Panel.



Inspect TOW Program Interrupt Control Panel for any damage that would make it not usable.

Report any damage on DA Form 2404. Replace equipment only if not usable.

Inside Installation Task 6: Install TOW Program Interrupt Control Panel on AH-1S (MC) and (ECAS).



CAUTION

Prior to completing this task, ensure an AH-1S System Mechanic is present.

Remove blank plate (1) from bottom of Pilot's instrument panel.

Retain plate for reinstallation after MILES exercise.

NOTE

Some aircraft do not have connector 20A15P01. Disregard the 20A15P01 connection if your aircraft does not have the connector.

If the Gunner's Accuracy Control Panel (GACP) is installed, connectors 20A16P01 and 20A15P01 will be connected to the GACP. Unplug connectors from GACP.

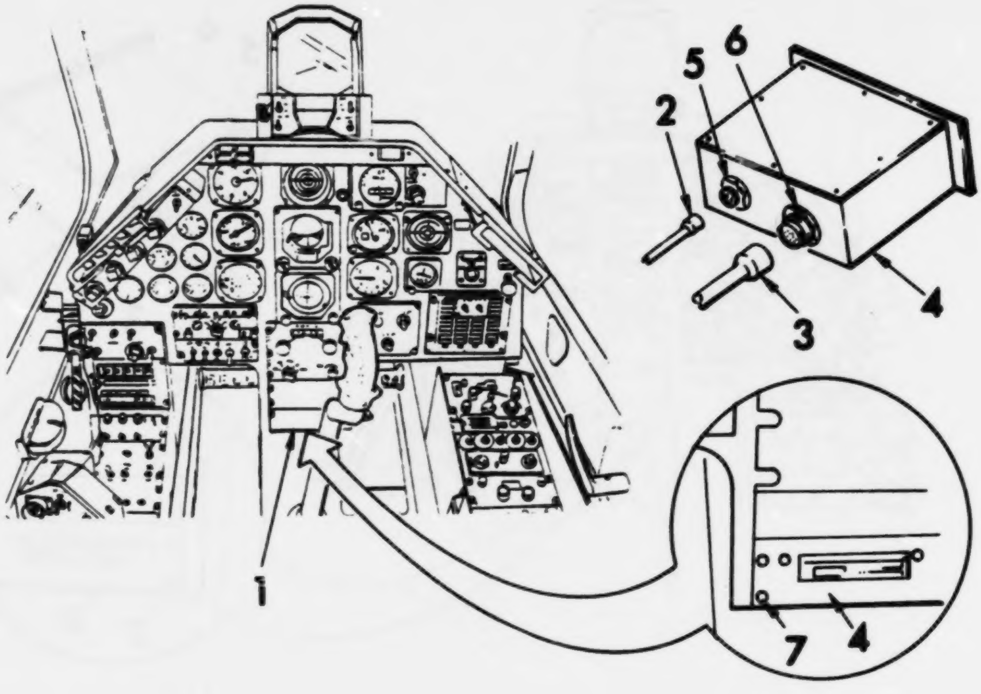
If Gunner's Accuracy Control Panel (GACP) is not installed, locate connectors 20A16P01 (2) and 20A15P01 (3) up under the instrument panel where plate (1) was removed.

Insert TOW Program Interrupt Control Panel (4) into space on instrument panel.

Attach connector 20A16P01 (2) to small connector 16J01 (5) and connector 20A15P01 (3) to large connector 15J01 (6) on rear of TOW Program Interrupt Control Panel (4).

Secure panel to instrument panel using attached fasteners (7).

Inside Installation Task 7: Install TOW Program Interrupt Control Panel on AH-1S (MOD).



CAUTION

Prior to next step, ensure an AH-1S System Mechanic is present.

NOTE

Some aircraft do not have connector 20A15P01. Disregard the 20A15P01 connection if your aircraft does not have the connector.

If the Gunner's Accuracy Control Panel (GACP) is installed in place of the Missile Status Panel (MSP) (1), connectors 20A16P01 and 20A15P01 will be connected to the GACP. Unplug connectors and remove GACP.

If Gunner's Accuracy Control Panel (GACP) is not installed, use the following procedure:

Unplug connector 20A16P01 (2) from MSP (1) in bottom of Pilot's Instrument Panel and remove MSP (1) from Pilot's Instrument Panel.

Retain MSP for reinstallation after MILES exercise.

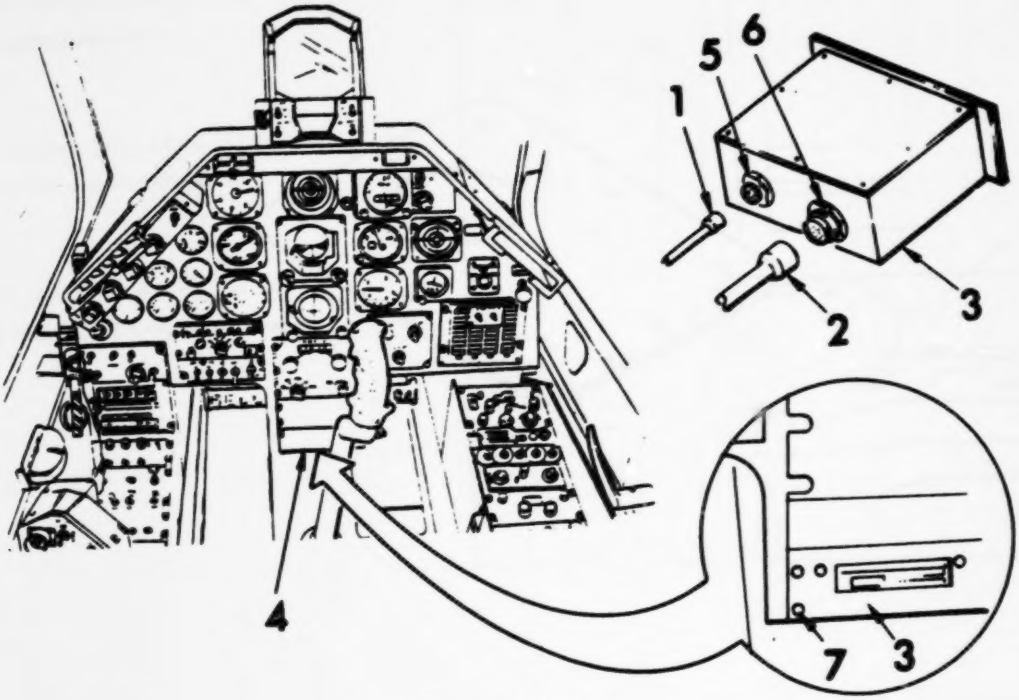
Locate connector 20A15P01 (3) up under the instrument panel where MSP (1) was removed.

Insert TOW Program Interrupt Control Panel (4) into space on instrument panel.

Attach connector 20A16P01 (2) to small connector 16J01 (5) and connector 20A15P01 (3) to large connector 15J01 (6) on rear of TOW Program Interrupt Control Panel (4).

Secure panel to instrument panel using attached fasteners (7).

Inside Installation Task 8: Install TOW Program Interrupt Control Panel on AH-1S (PROD).



CAUTION

Prior to next step, ensure an AH-1S System Mechanic is present.

NOTE

Some aircraft do not have connector 20A15P01. Disregard the 20A15P01 connection if your aircraft does not have the connector.

If the Gunner's Accuracy Control Panel (GACP) is installed, connectors 20A16P01 and 20A15P01 will be connected to the GACP. Unplug connectors from GACP.

If Gunner's Accuracy Control Panel (GACP) is not installed, use the following procedure:

Unplug connector 20A16P01 (1) from shorting panel up under Pilot's Instrument Panel.

Remove shorting panel from instrument panel.

Retain shorting panel for reinstallation after MILES exercise.

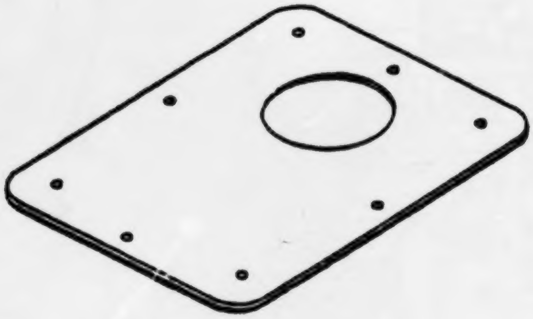
Locate connector 20A15P01 (2) up under instrument panel where shorting panel was removed.

Insert TOW Program Interrupt Control Panel (3) into space (4) on instrument panel.

Attach connector 20A16P01 (1) to small connector 16J01 (5) and connector 20A15P01 (2) to large connector 15J01 (6) on rear of TOW Program Interrupt Control Panel (3).

Secure panel to instrument panel using attached fasteners (7).

Inside Installation Task 9: Inspect Floor Plate.



Inspect MILES floor plate for any damage that would prevent its installation.

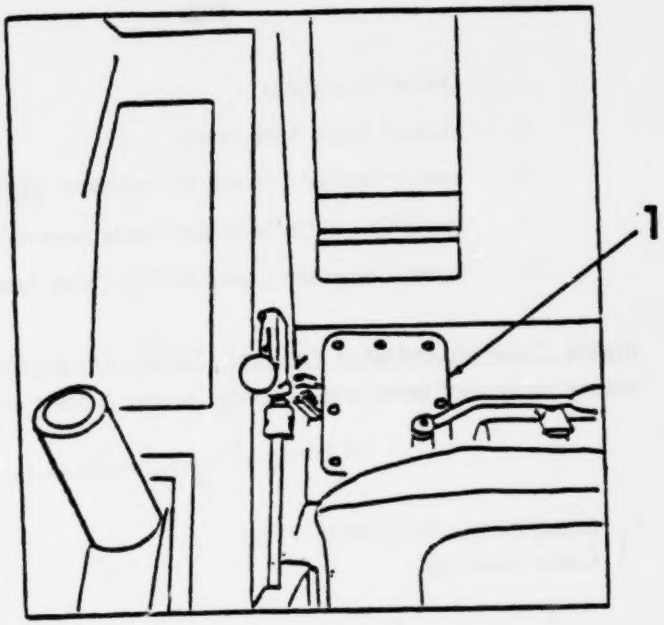
Report any damage on DA Form 2404. Replace equipment only if unable to install.

Inside Installation Task 10: Install Floor Plate.

On AH-1S (MOD), remove the radio from the radio bracket.

Remove existing floor plate (1) on left side of gunner's compartment.

Set plate aside for return to AH-1S following MILES training exercises.

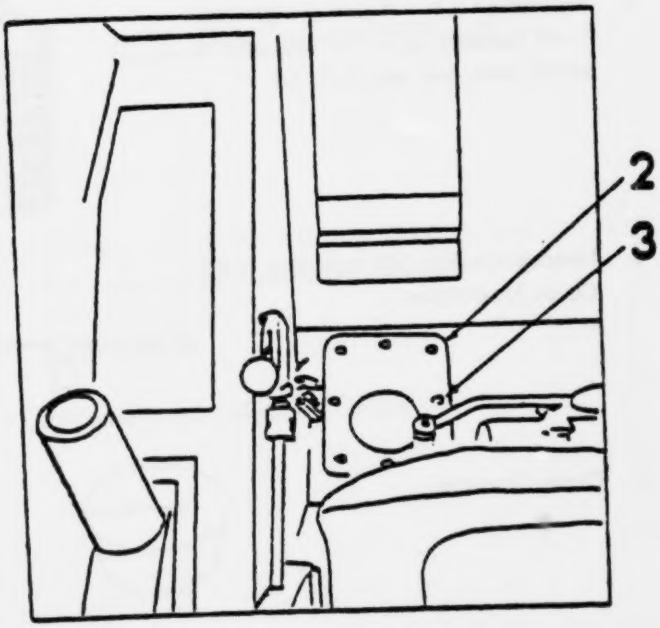


Replace AH-1S floor plate with MILES floor plate (2).

NOTE

The hole in the MILES floor plate is not in the center. Install the plate with the hole toward the Rear of the aircraft with part number facing down.

Use original screws (3) to secure plate.

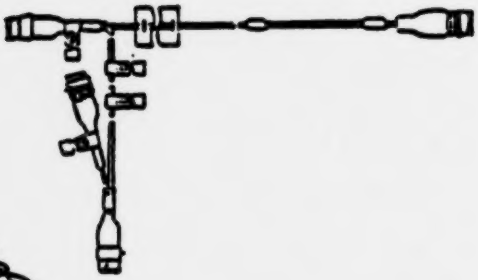


INSIDE CABLE INSTALLATION TASKS – LIST

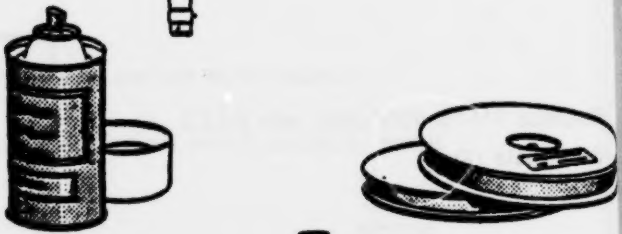
Task	Title	Page
1.	Obtain Equipment	2-20
2.	Inspect Cable Assemblies	2-21
3.	Install Headset-Cockpit Kill Indicator (CKI) Cable Assembly	2-22
4.	Install CKI-ALCA Interface Cable Assembly	2-24
5.	Install Constraint Override-TSU Cable Assembly	2-27

Inside Cable Installation Task 1: Obtain Equipment. Completion of Inside Cable Installation Tasks require equipment listed and illustrated below. Locate and set aside this equipment.

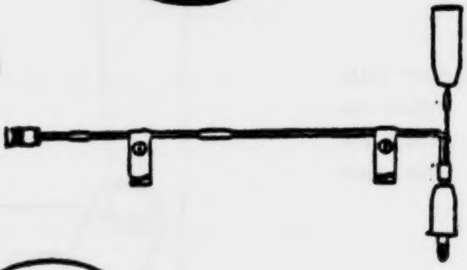
1 CONSTRAINT OVERRIDE – TSU Cable Assembly



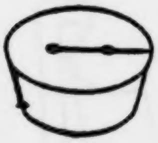
1 Installation Kit – 1 can primer and 1 roll fastener tape (For resupply of either item, see Appendix D)



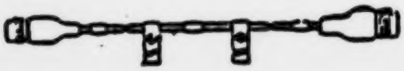
2 Headset-Cockpit Kill Indicator (CKI) Cable Assemblies



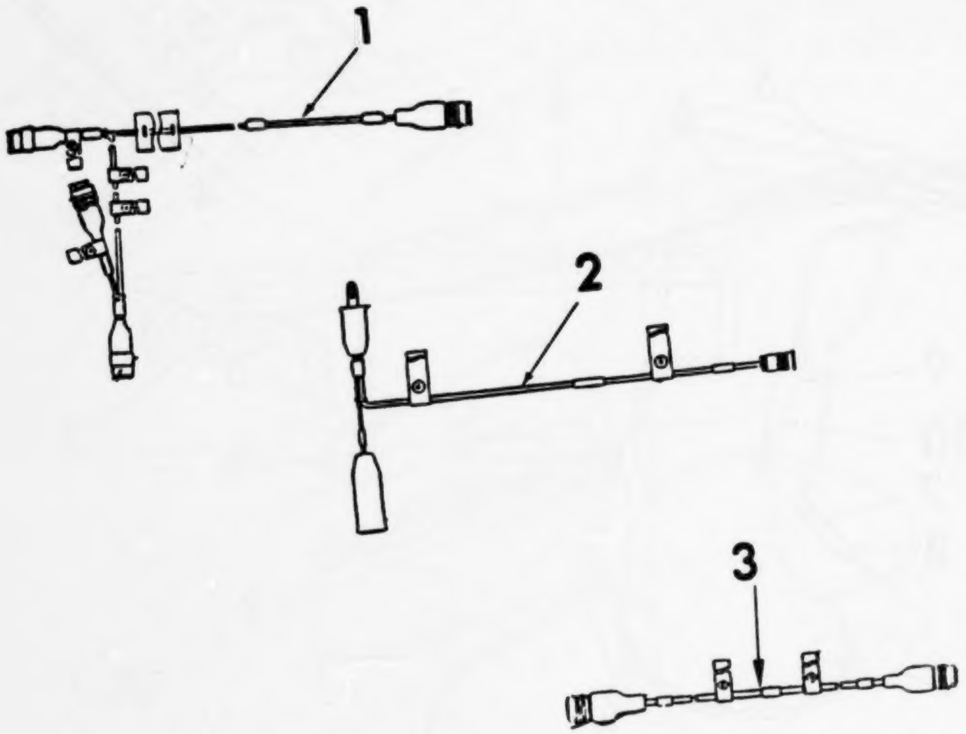
1 Cable Grommet



1 CKI-ALCA Interface Cable Assembly



Inside Cable Installation Task 2: Inspect Cable Assemblies.

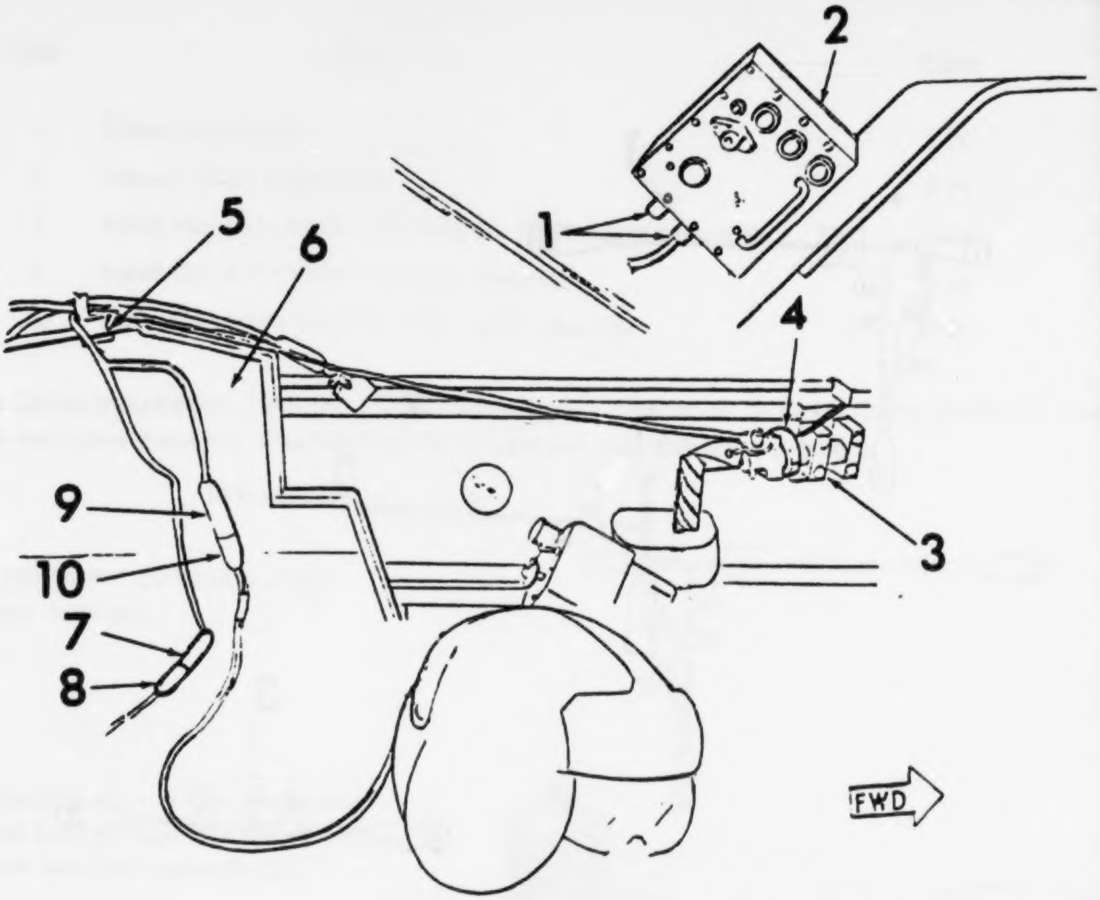


Inspect CONSTRAINT OVERRIDE - TSU cable (1). Headset-Cockpit Kill Indicator (CKI) (2) and CKI-ALCA (3) Cable Assemblies for any visual damage that would prevent their installation or use.

Check that all connectors and connector pins are undamaged.

Report any damage on DA Form 2404. Replace cable assemblies only if not usable.

Inside Cable Installation Task 3: Install Headset-Cockpit Kill Indicator (CKI) Cable Assembly.



NOTE

Two Headset-CKI Cable Assemblies are required. One is installed for the Pilot and one is installed for the Gunner.

Pilot

Locate Headset-CKI Cable Assembly.

Connect P1 on Headset-CKI Cable Assembly to either J2 or J3 connector (1) on CKI (2).

Route cable down left side of cockpit interior.

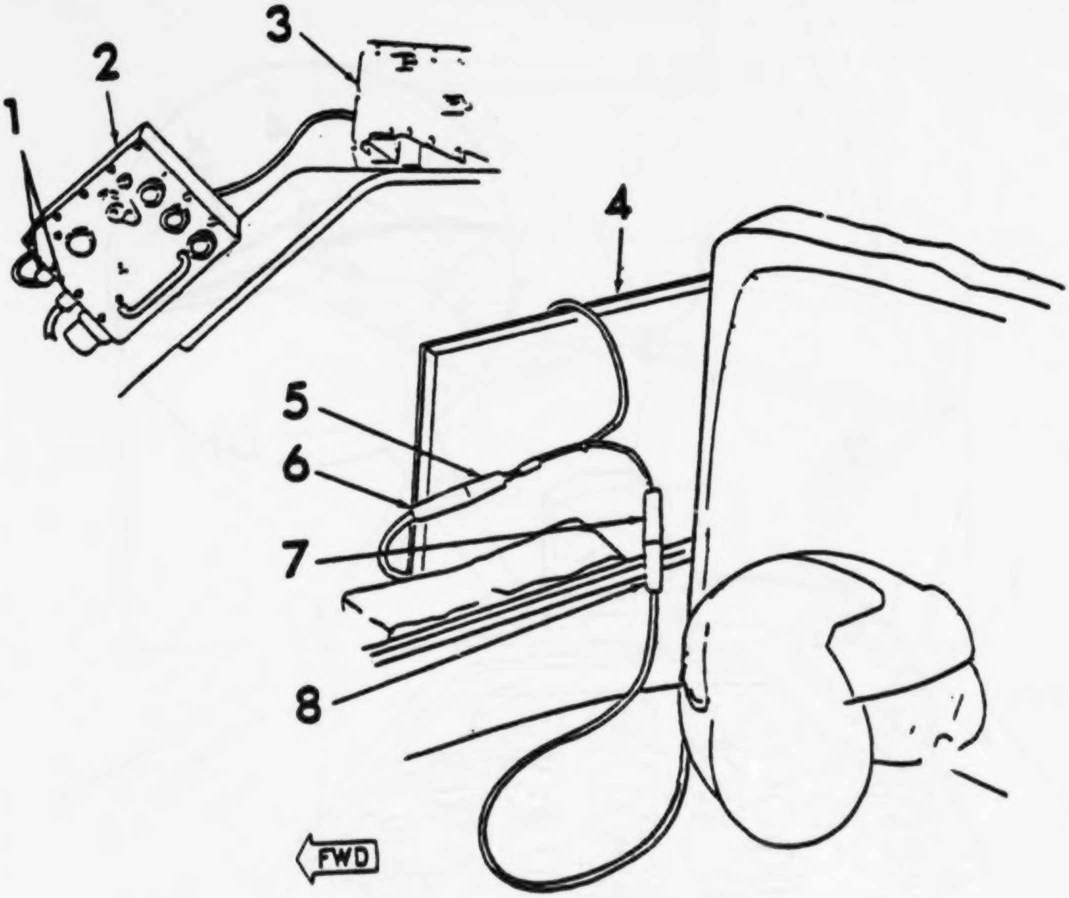
Attach cable to canopy ejection assembly (3) using the first fastener strap (4) on the cable.

Route cable under aircraft headset cable securing clip (5) on left armor plate (6).

Plug P2 (7) into headset connector (8).

Plug P3 (9) into the Pilot's helmet headset connector (10).

Secure cable out of way using fastener tape straps to attach cable to aircraft hardware or cable assemblies.



Gunner

Locate Headset-CKI Cable Assembly.

Connect P1 on remaining Headset-CKI Cable Assembly to either J2 or J3 connector (1) on CKI (2). Select unused CKI connector.

Route cable behind Pilot's Heads Up Display (3) and down right side of Gunner's cockpit. Keep outboard of right side armor plate (4).

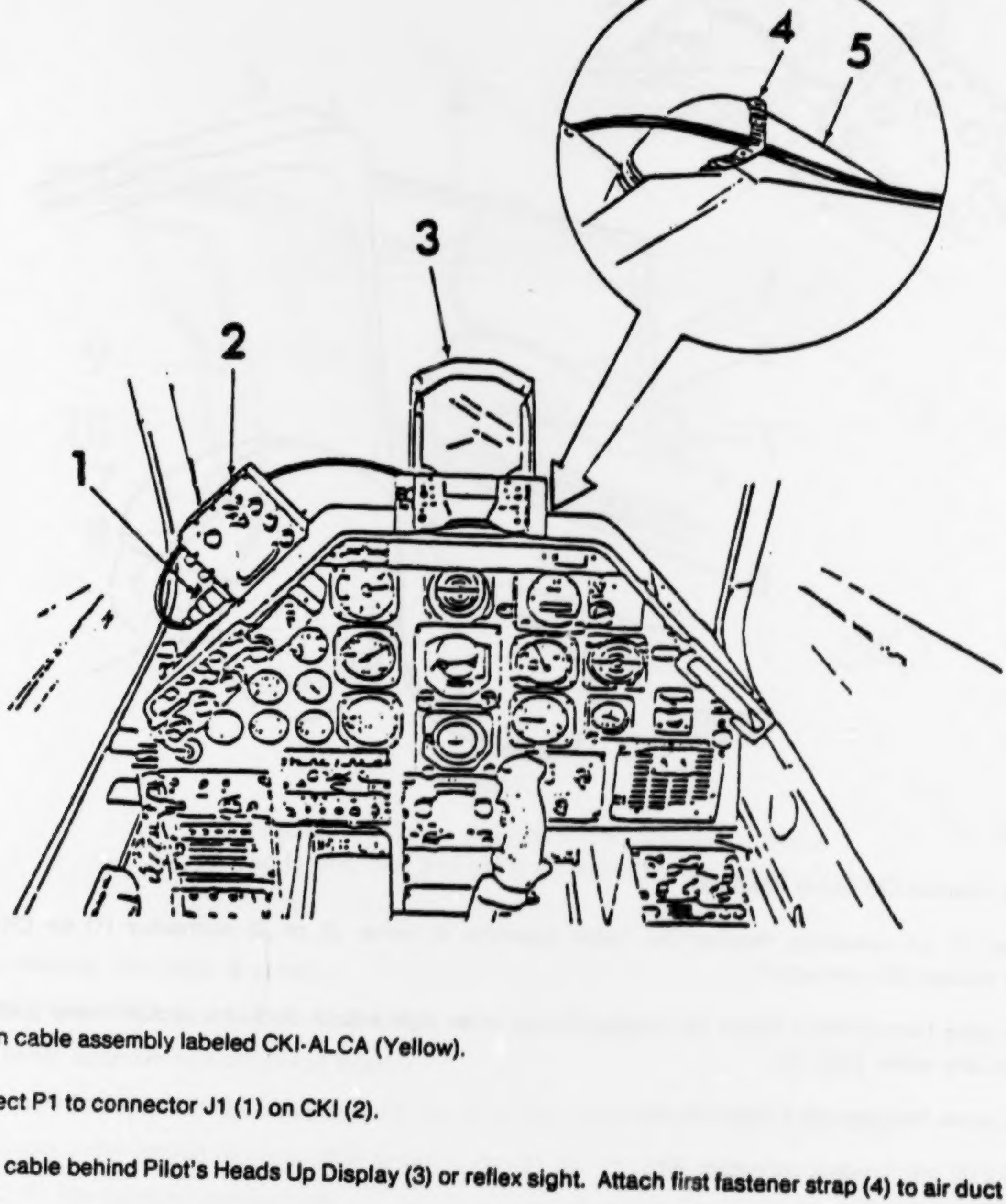
Route under headset cable securing clip.

Plug P2 (5) into headset connector (6).

Plug P3 (7) into Gunner's helmet headset connector (8).

Secure cable out of way using fastener tape straps to attach cable to aircraft hardware or cable assemblies.

Inside Cable Installation Task 4: Install CKI - ALCA Interface Cable Assembly.

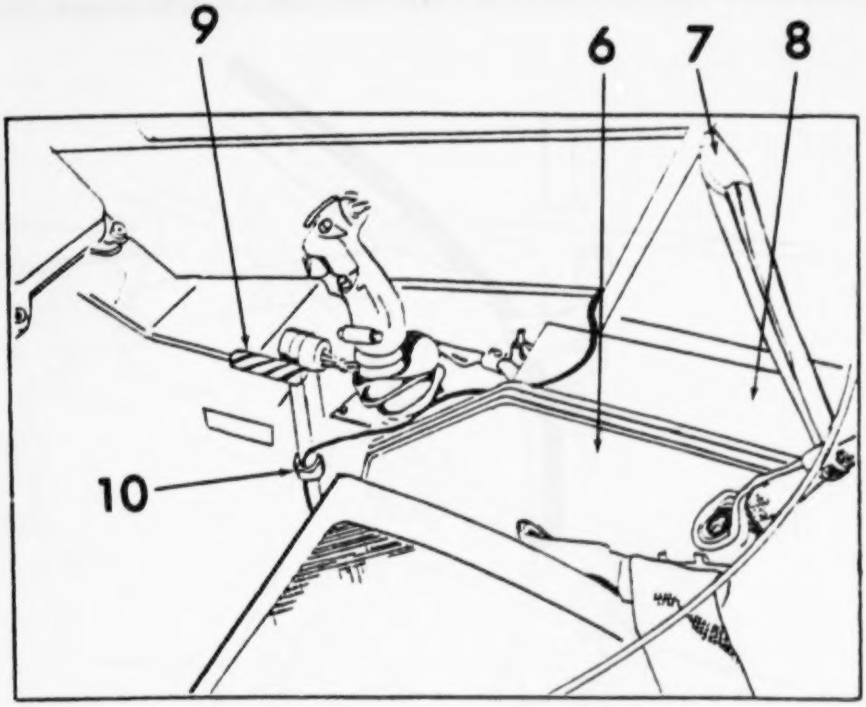


Obtain cable assembly labeled CKI-ALCA (Yellow).

Connect P1 to connector J1 (1) on CKI (2).

Route cable behind Pilot's Heads Up Display (3) or reflex sight. Attach first fastener strap (4) to air duct (5).

Secure cable out of way using fastener tape straps to attach cable to aircraft hardware or cable assemblies.

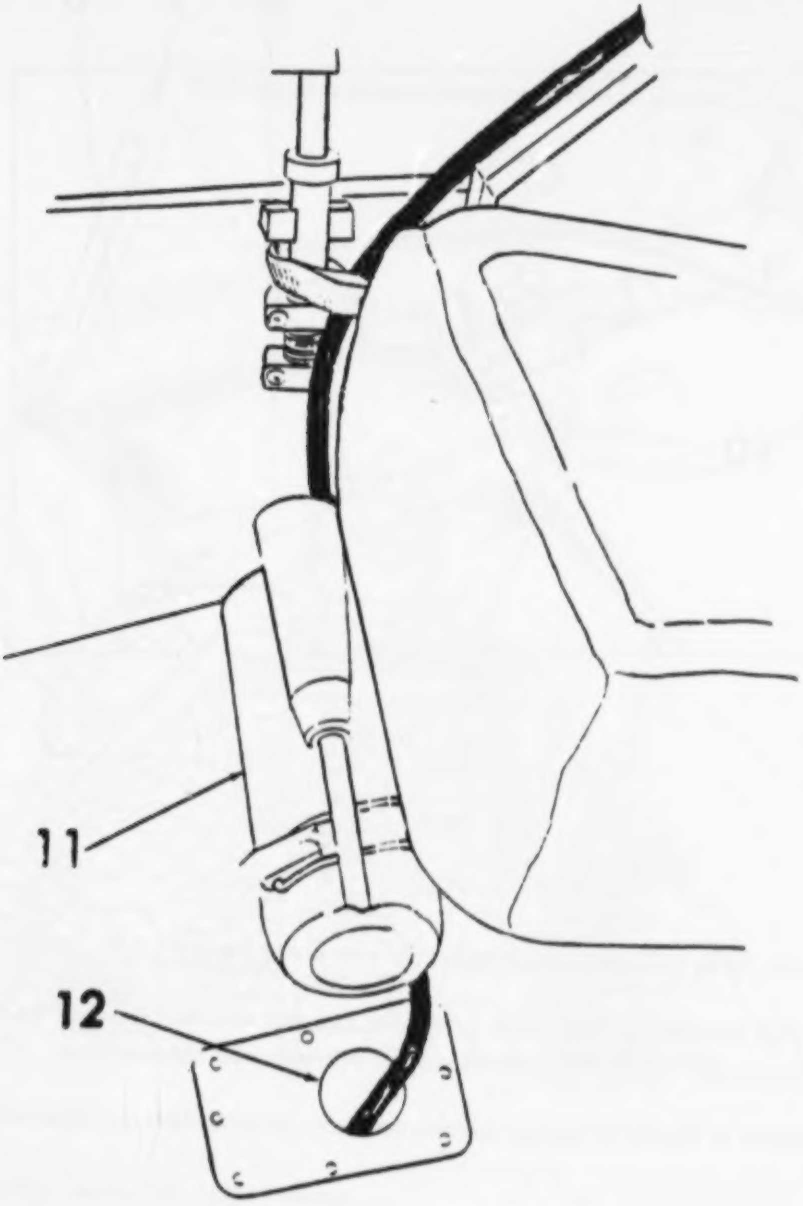


Route cable forward. Keep outboard of Gunner's right side armor plate (6).

Lift up Gunner's right arm pad (7) and route cable over arm rest support (8). Replace arm rest pad and use pressure to secure pad, cable and arm rest support with attached fastener tape.

Attach cable to bottom of Gunner's canopy ejection assembly (9) using fastener tape strap (10) on cable.

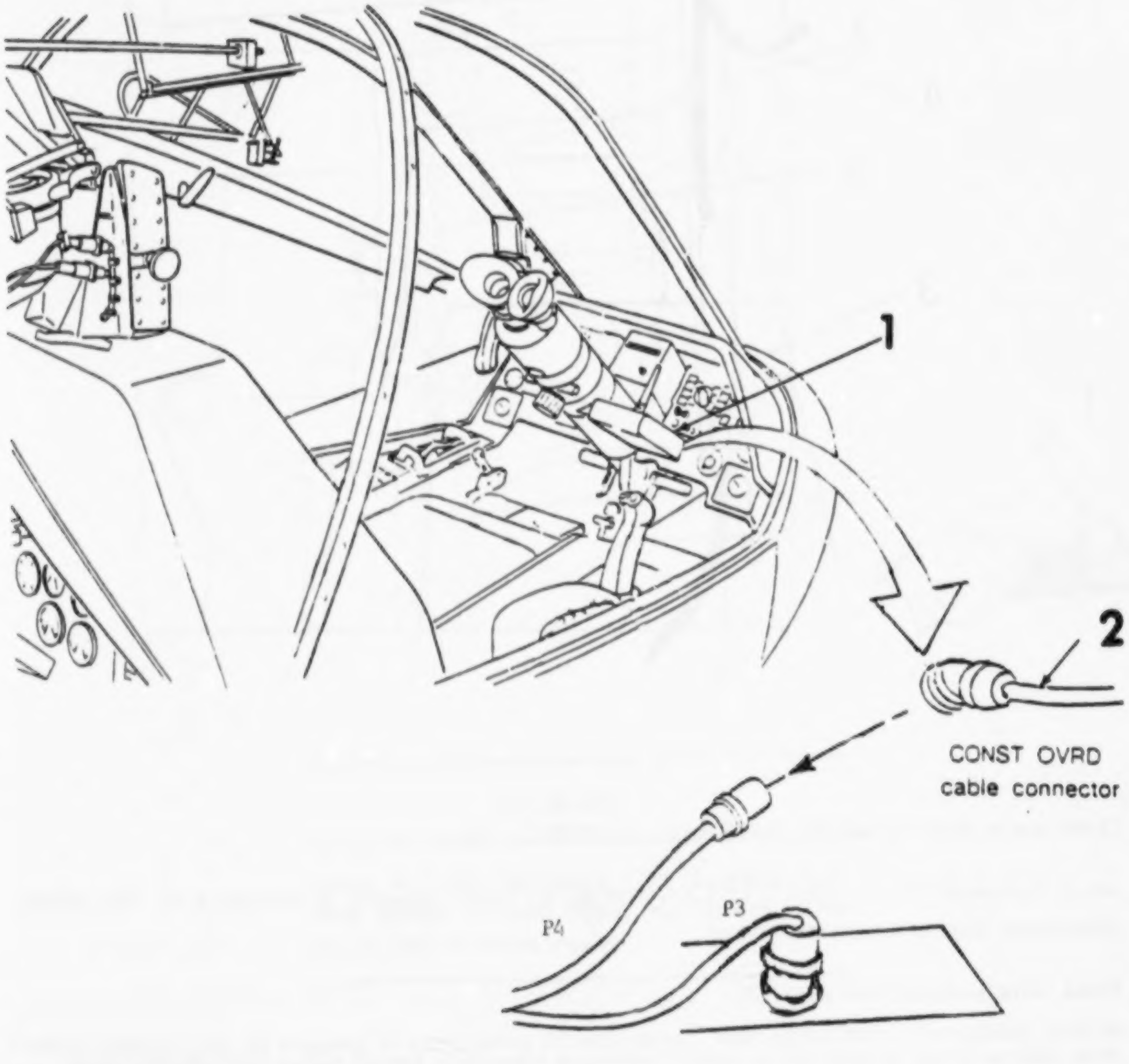
Inside Cable Installation Task 4: Install CKI-ALCA Interface Cable Assembly (Cont).



Route cable to left of cockpit. Keep cable behind fire extinguisher (11). Remove and replace fire extinguisher, if necessary.

Route remaining cable through hole in MILES floor plate (12), through ammunition way, and into the ammunition bay.

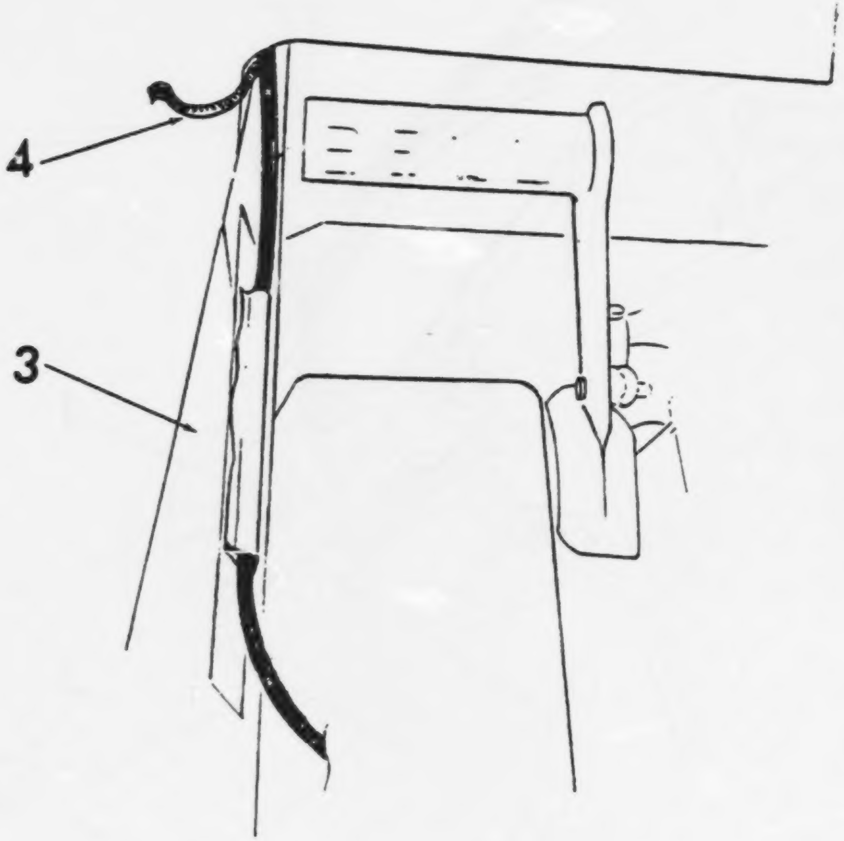
Inside Cable Installation Task 5: Install Constraint Override - TSU Cable Assembly.



Locate and uncoil CONSTRAINT OVERRIDE-TSU Cable Assembly.

Route connectors P3 and P4 above pedals and across aircraft towards Gunner Sight Hand Control (SHC) (1). Remove CONST OVRD cable connector (2) from Sight Hand Control Assembly. Connect P4 to cable connector. Connect P3 to Sight Hand Control receptacle. Secure cable out of way using fastener tape straps to attach cable to aircraft hardware or cable assemblies.

Inside Cable Installation Task 5: Install Constraint Override - TSU Cable Assembly (Cont).

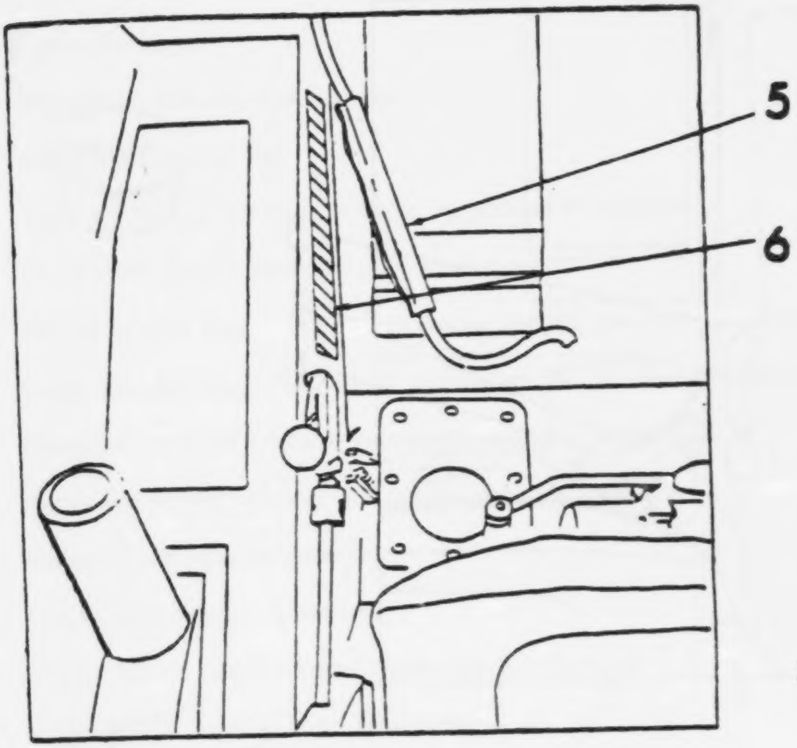


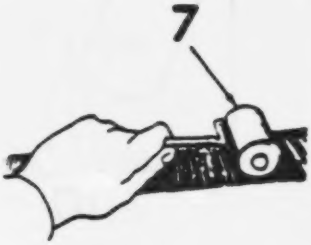
Obtain cable assembly labeled CONSTRAINT OVERRIDE - TSU.

Attach connector P2 on CONSTRAINT OVERRIDE-TSU Cable Assembly to receptacle on TSU adapt cable under Gunner's instrument panel.

Route cable along left kick panel (3).

Wrap fastener strap (4) attached to cable to structural member or aircraft cables near left kick panel.





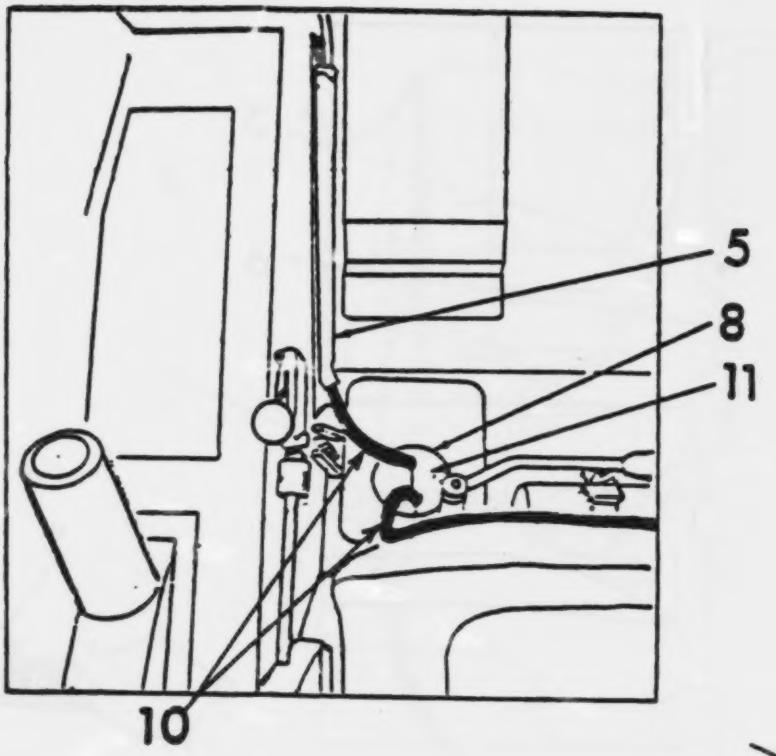
WARNING

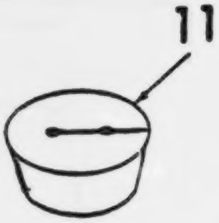
Primer is highly flammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

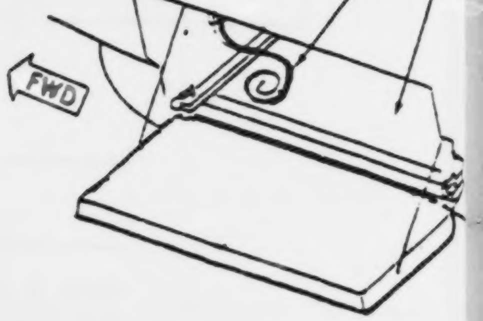
Position fastener pad (5) attached to cable along left kick panel. Mark its location. Temporarily remove pad, clean area and cover with coat of spray primer.

Cut a strip of fastener tape slightly longer than fastener pad. Remove protective backing. Press tape (6) firmly against area primed and marked on kick panel. Use Hand Roller (7) (Item 7, Appendix C) as shown.

Inside Cable Installation Task 5: Install Constraint Override - TSU Cable Assembly (Cont).







Press fastener pad (5) and cable to tape on kick panel.

Route cable through hole in floor plate (8), through ammunition way, and into ammunition bay (9).

Place CONSTRAINT OVERRIDE-TSU and CKI-ALCA INTFC cables (10) into grommet holes and install cable grommet (11) into floor plate.

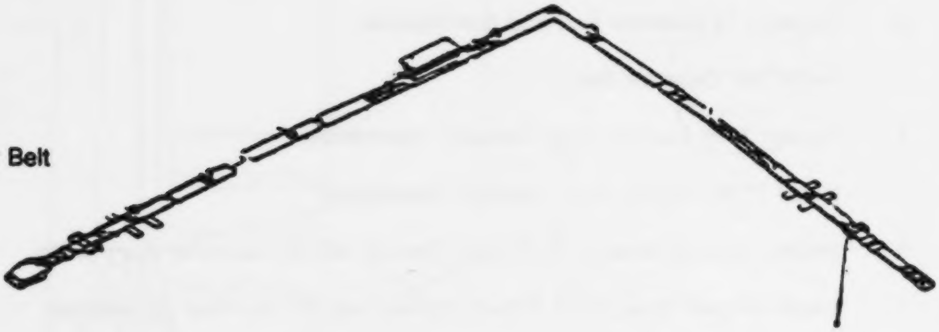
On AH-1S (MOD), install previously removed radio to radio bracket.

OUTSIDE INSTALLATION TASKS – LIST

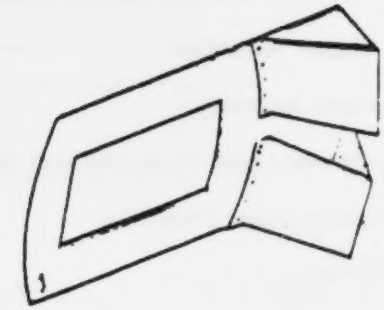
Task	Title	Page
1.	Obtain Equipment	2-32
2.	Inspect Sail Detector Belt and Belt Retainer	2-35
3.	Install Sail Detector Belt	2-36
4.	Inspect TOW Launch Rack Detector Assemblies	2-42
5.	Install TOW Launch Rack Detector Assemblies	2-43
6.	Inspect Aircraft Weapon (2.75-Inch Rocket) MILES Launcher Assemblies	2-46
7.	Install Aircraft Weapon (2.75-Inch Rocket) MILES Launcher Assemblies	2-47
8.	Inspect Aircraft Kill Indicator and Smoke Indicator Assembly	2-48
9.	Install Aircraft Kill Indicator and Smoke Indicator Assembly	2-49
10.	Inspect ALCA Adapter Assembly	2-50
11.	Install ALCA Adapter Assembly	2-51
12.	Inspect 20 mm Cannon Laser Transmitter and Support	2-52
13.	Install 20 mm Cannon Laser Transmitter	2-53
14.	Inspect FLASHWESS	2-55
15.	Install FLASHWESS	2-56
16.	Deleted	2-57

Outside Installation Task 1: Obtain Equipment. Completion of Outside Installation Tasks require equipment listed and illustrated below. Locate and set aside this equipment.

1 Sail Detector Belt

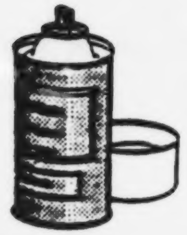


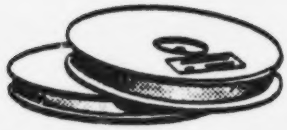
1 Sail Detector Belt Retainer – required for models without Airborne Laser Tracker (ALT)



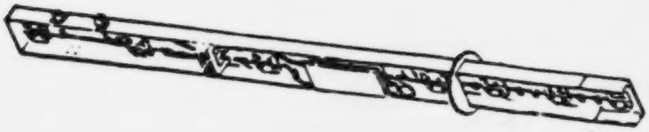
4 Sail Detector Belt Retainer Screws – required for models without Airborne Laser Tracker (ALT)

1 Installation Kit – 1 can primer and 1 roll fastener tape (For resupply of either item, see Appendix D)

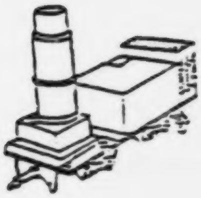




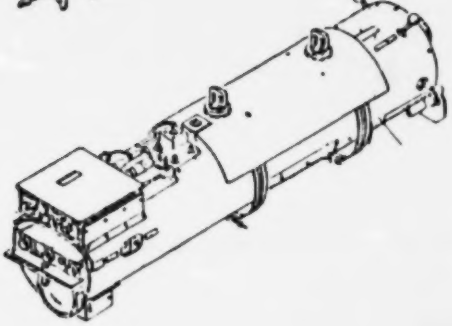
2 TOW Launch Racks



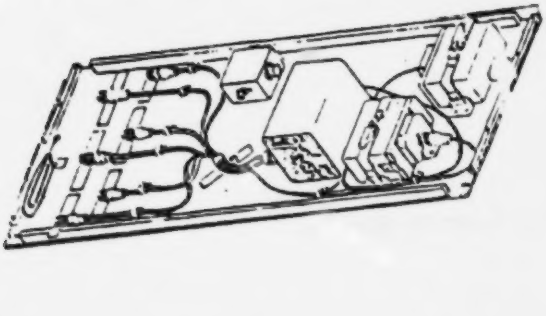
1 AKI and Smoke Indicator Assembly



2 Aircraft Weapon (2.75-inch Rocket), MILES Launcher Assemblies

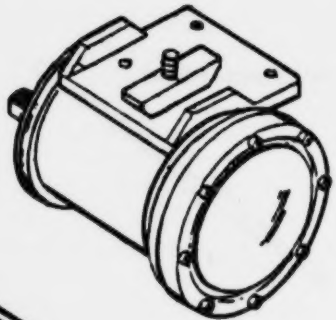


1 ALCA Adapter Assembly

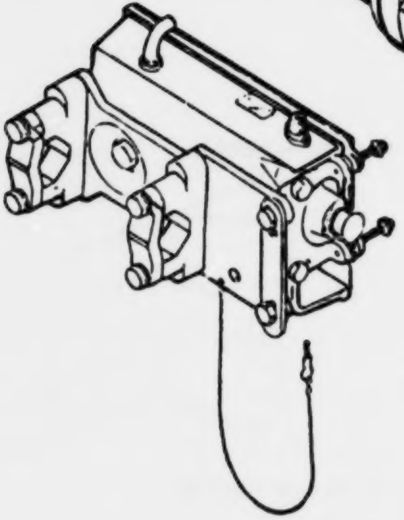


Outside Installation Task 1: Obtain Equipment (Cont).

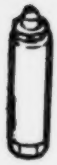
1 FLASHWESS



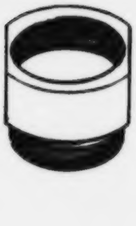
1 20 mm Cannon Laser Transmitter



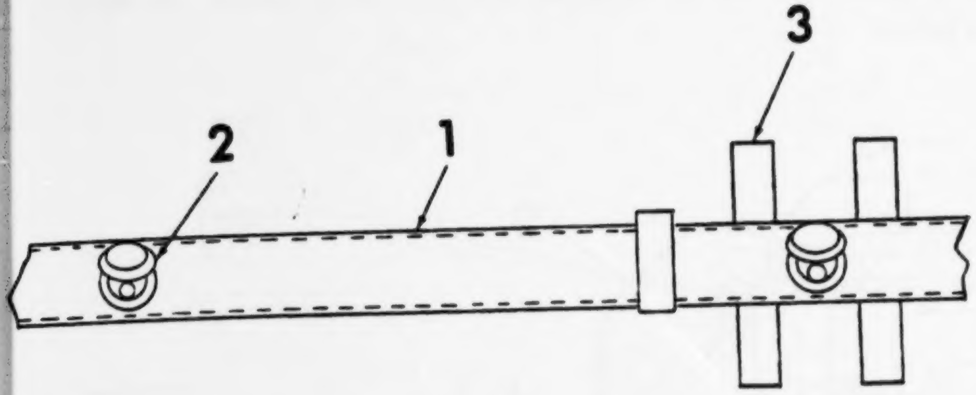
1 Plunger

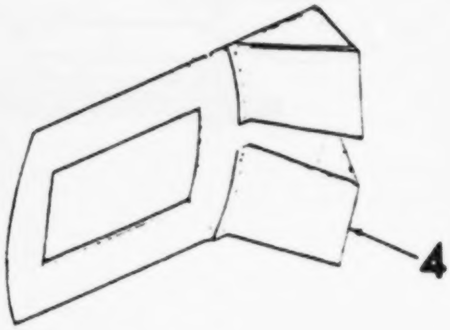


2 Launcher Assembly Spacers



Outside Installation Task 2: Inspect Sail Detector Belt and Belt Retainer.





Look for any damage that would prevent normal installation or use of detector belt (1) or Sail Detector Belt Retainer (4).

Wipe detectors (2) clean.

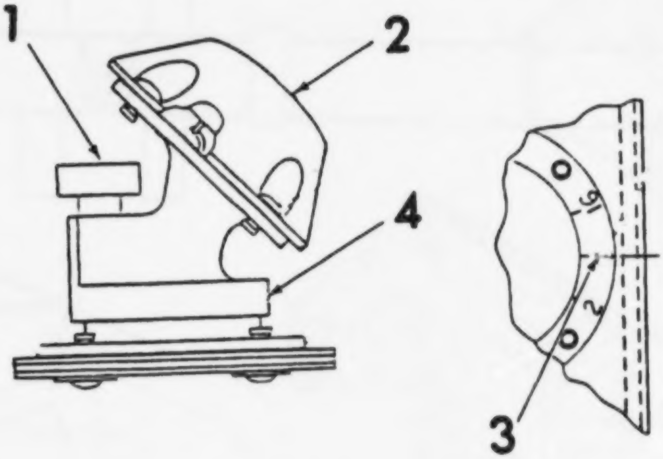
Open and unfold all detector belt tabs (3).

Report any damage on DA Form 2404.

Replace detector belt or Sail Detector Belt Retainer only if not usable.

Outside Installation Task 3: Install Sail Detector Belt.

Adjustable detectors on the sail belt must be pre-aligned before the belt is installed. To adjust the detectors, proceed as follows:

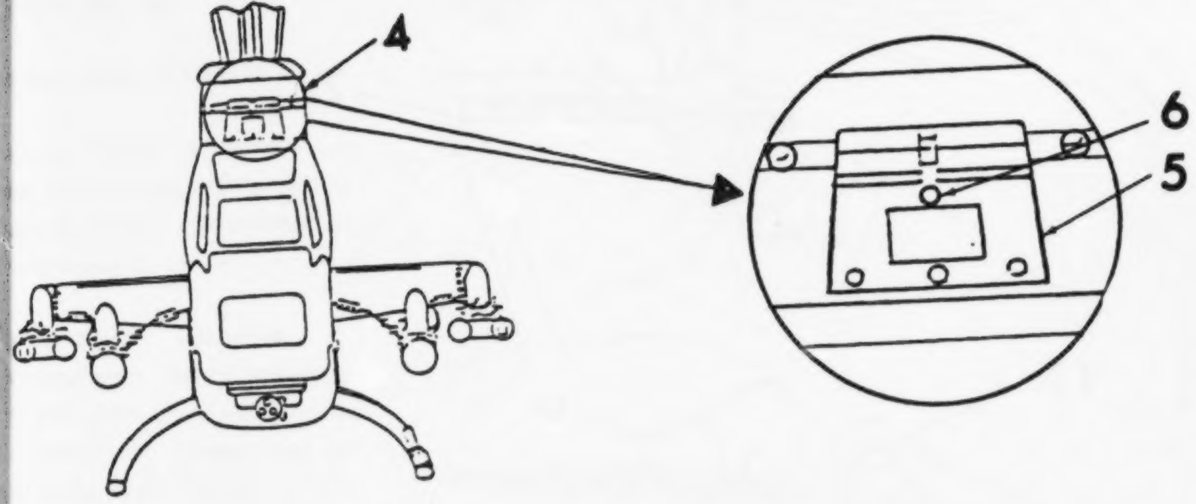


Pull up the spring plunger (1) and hold it in up position.

Turn detector (2) until detector index line (3) on detector body is pointing to white dot (4) on its base.

Release plunger. Make sure plunger returns to its down and locked position.

Repeat procedure for all adjustable detectors.



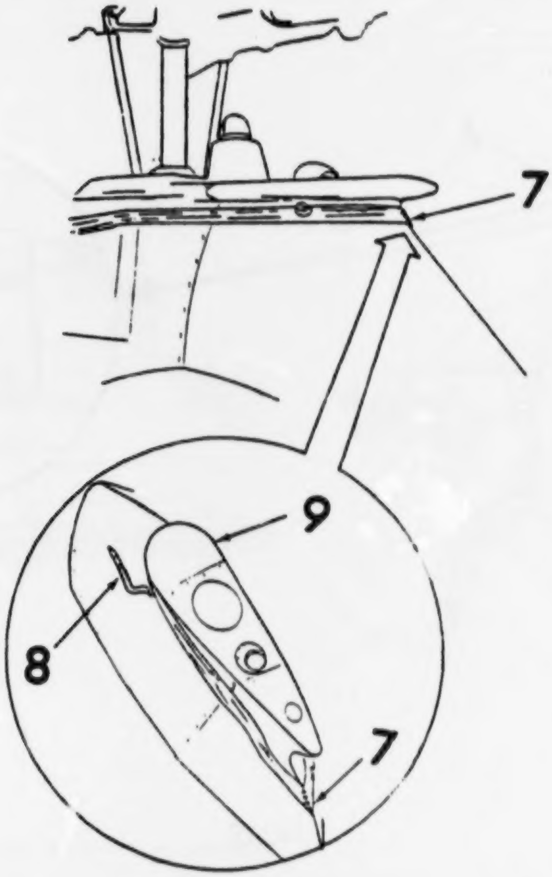
NOTE

Omit this step if helicopter is equipped with ALT. Turn to Page 2-38.

Remove four existing aircraft screws from front of sail (4). Retain screws for reinstallation following MILES training exercises.

Place Sail Detector Belt Retainer (5) in position over screw holes and install four MILES-supplied MS51958-68 screws (6).

Outside Installation Task 3: Install Sail Detector Belt (Cont).



All Models

NOTE

Two airmen are required to install the sail belt.

Position belt on sail. Place crease (7) at rear with the buckle on left side.

Wrap belt completely around aircraft sail. Keep under sail lip.

If belt retainer is installed, route belt through retainer loops.

Keep belt below Pitot tube (8) and forward of sail dome (9).

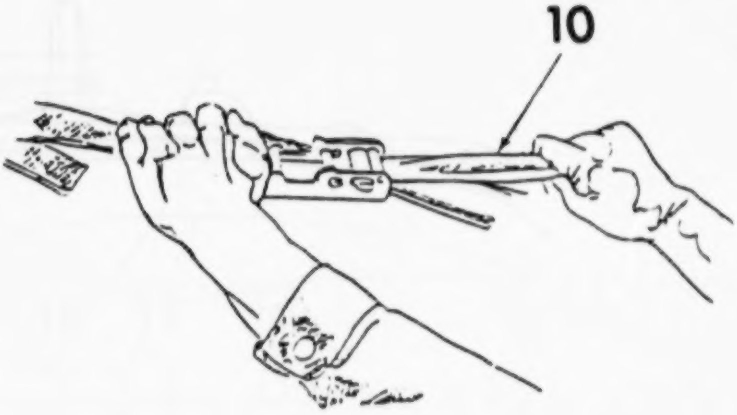
With buckle at right angle, take out most of the slack in detector by pulling on loose end of belt (10).

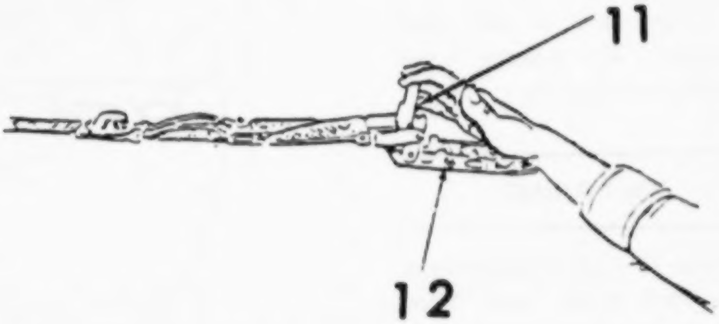
Slowly latch buckle (11).

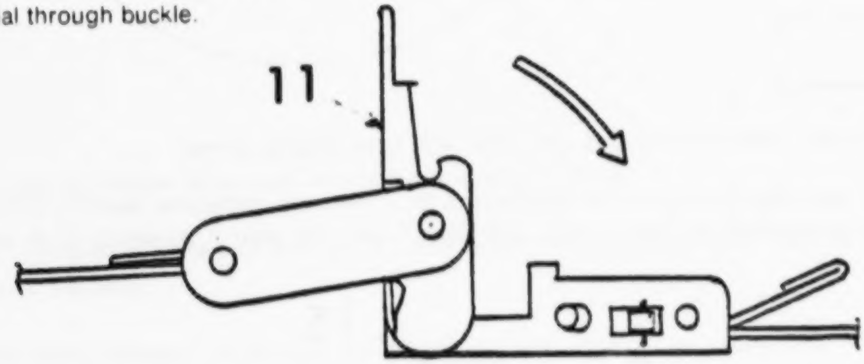
Heavy resistance should not be encountered until buckle is approximately perpendicular with fuselage.

If heavy resistance is encountered before reaching this position, press belt tension release (12). Loosen belt by allowing small amount of belt material through buckle.

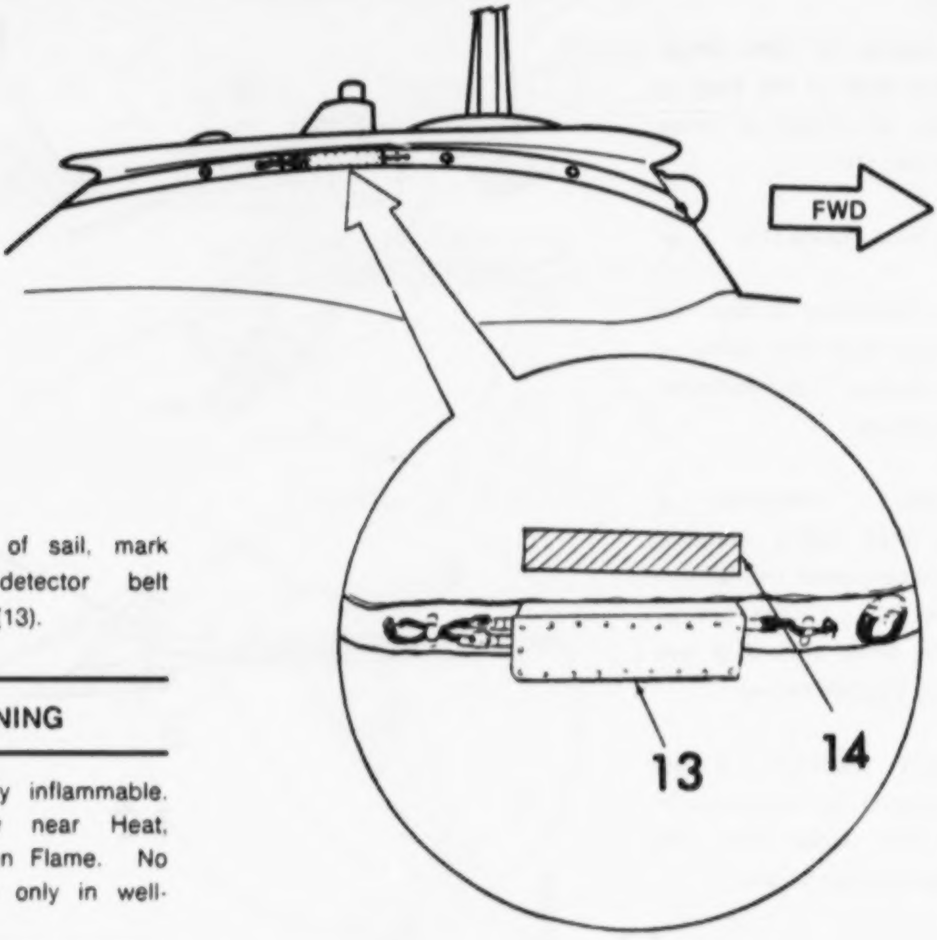
If heavy resistance is not encountered at perpendicular point, pull some more belt material through buckle.







Outside Installation Task 3: Install Sail Detector Belt (Cont).



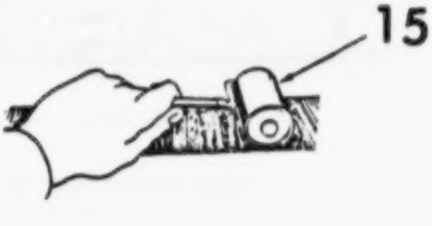
On right side of sail, mark location of detector belt electronics box (13).

WARNING

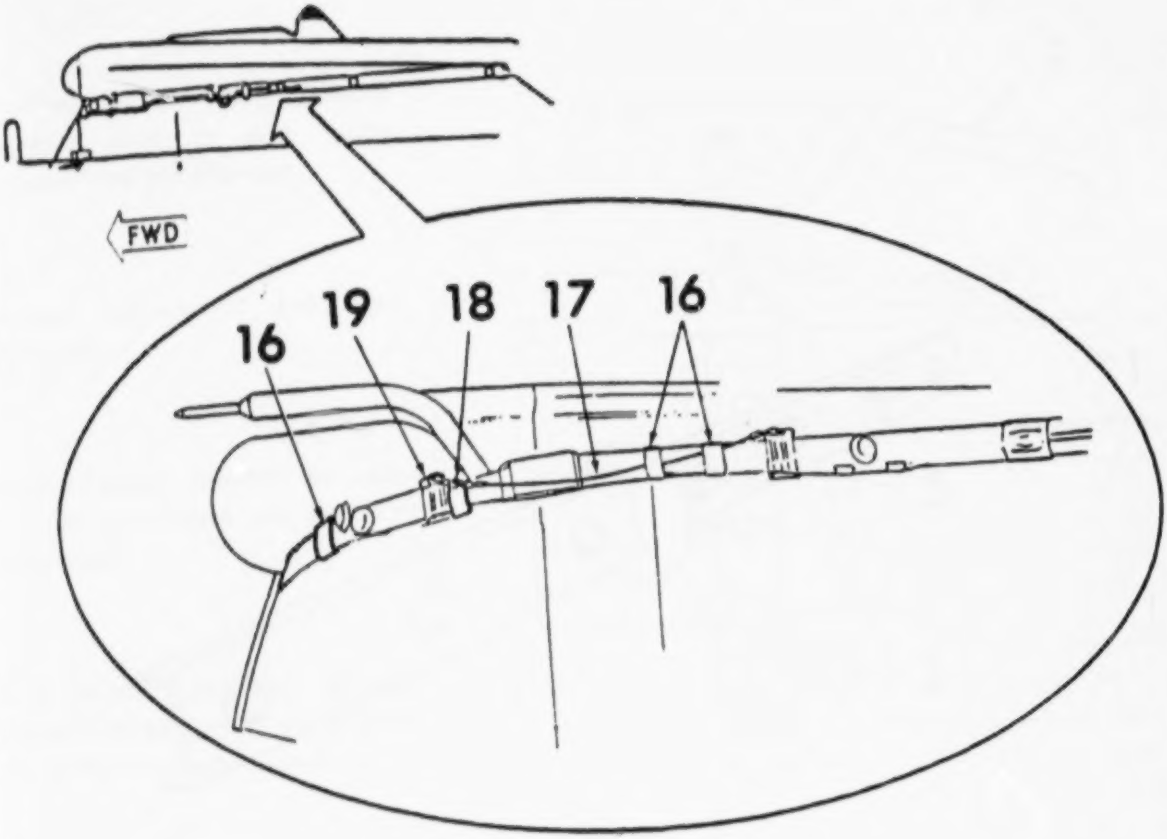
Primer is highly inflammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Temporarily move belt away, clean marked area and cover with coat of spray primer.

Cut a strip of fastener tape slightly longer than electronics box. Remove protective backing and pres tape (14) firmly against primed area marked on sail. Use Hand Roller (15) (Item 7, Appendix C) as shown



Press electronics box (13) against fastener tape (14).

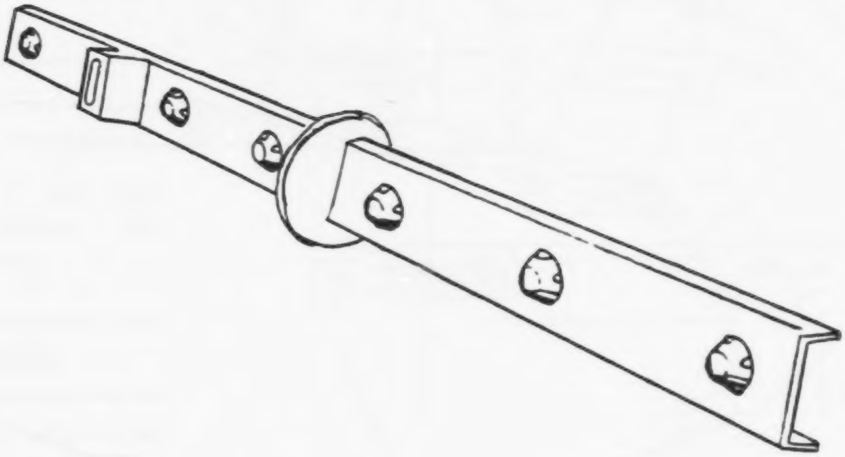


Make sure the buckle is securely locked in its closed position.

Gather up loose belt material and fold it under elastic keepers (16). Make sure no loose ends are allowed to flap in the wind.

Thread safety lanyard (17) through two elastic keepers. Route past buckle and thread through remaining elastic keepers (18). Attach safety lanyard to belt end clamp (19). Hole in belt end clamp is provided for attaching cable.

Outside Installation Task 4: Inspect TOW Launch Rack Detector Assemblies.



Inspect TOW Launch Rack Detector Assemblies for any visible damage that would prevent pro installation or use.

Check for broken wires, detectors or connectors.

Check for bent or twisted frame.

Report any damage on DA Form 2404. Replace equipment only if not usable.

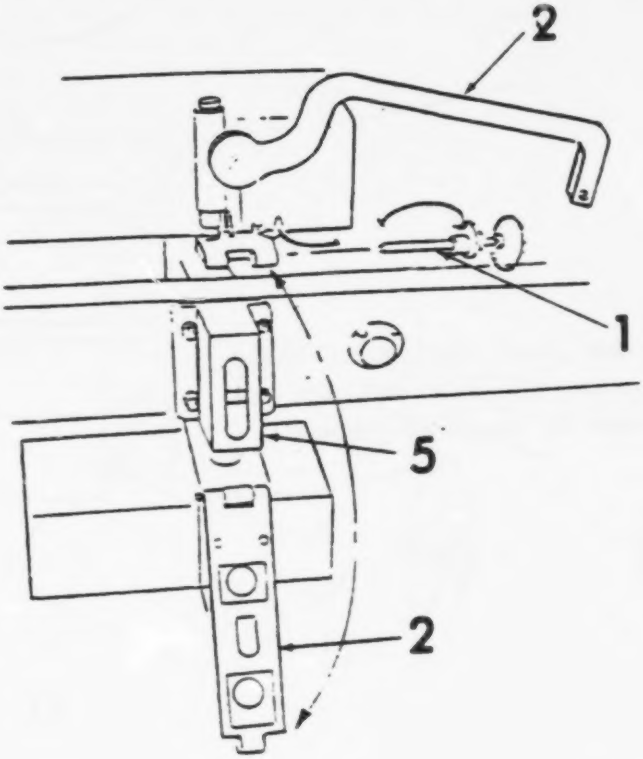
Outside Installation Task 5: Install TOW Launch Rack Detector Assemblies.

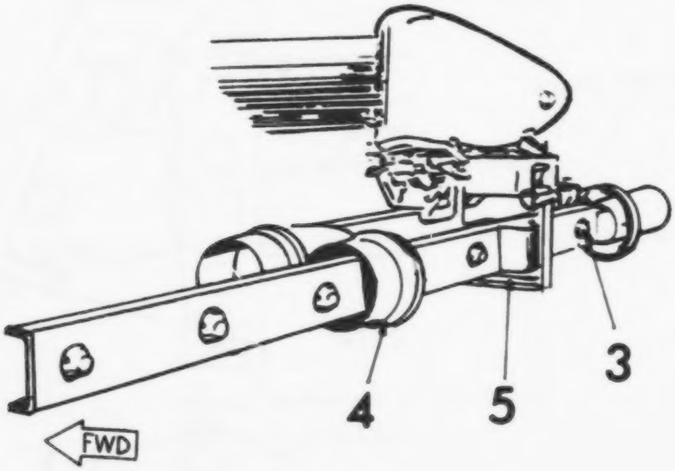
A TOW Launch Rack Detector Assembly goes in each upper outboard TOW launcher rack.

Unfasten keepers (1) and open latches (2).

Position Detector Assembly so cable is to rear and inboard, and detectors (3) outboard.

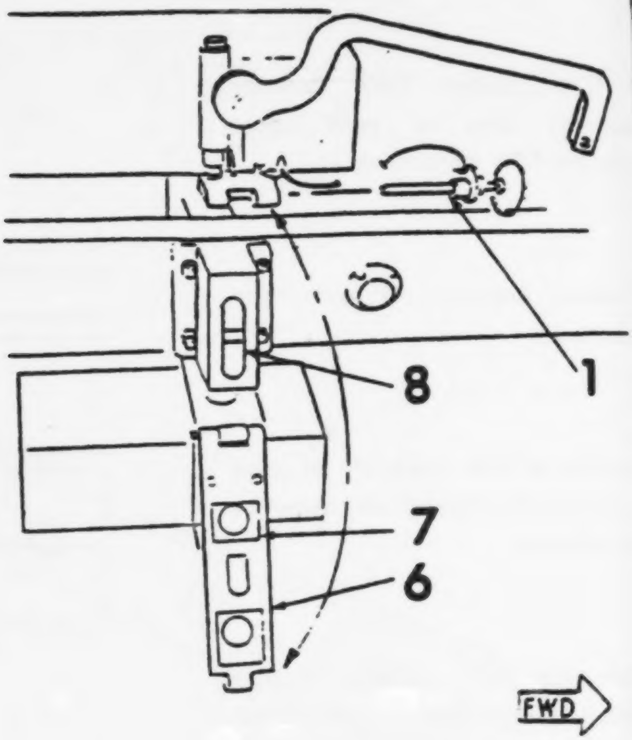
Slide detector assembly through circular TOW support (4) and position mating block (5) under latches.



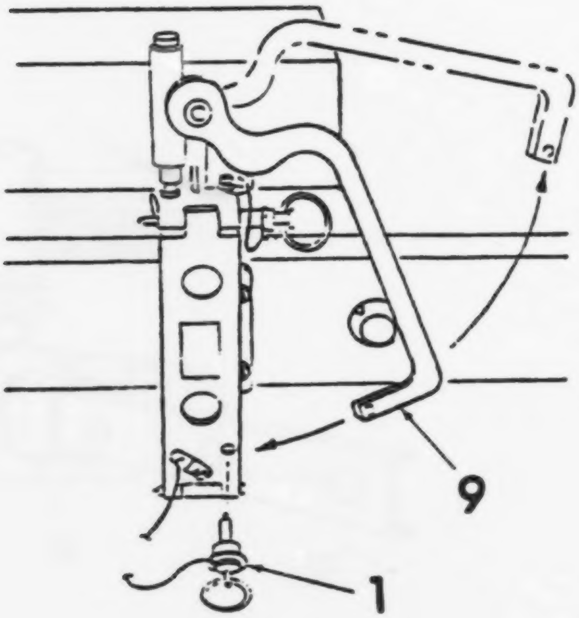


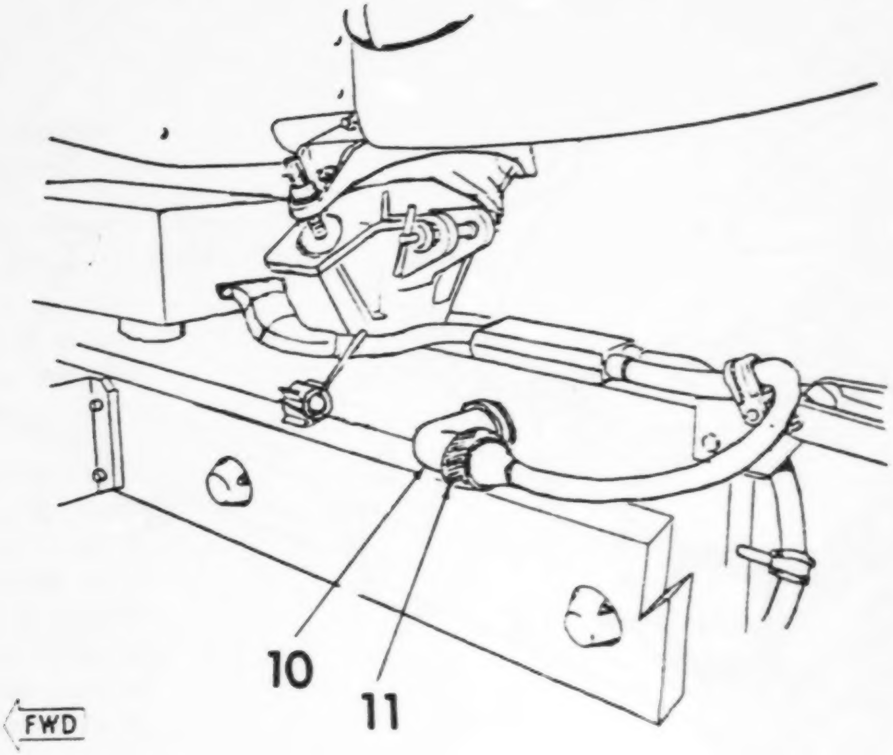
Outside Installation Task 5: Install TOW Launch Rack Detector Assemblies (Cont).

Close lower latch (6). Raised surfaces (7) must mate with top indent (8). Secure with keeper (1).



Close locking latch (9) and secure with keeper (1).



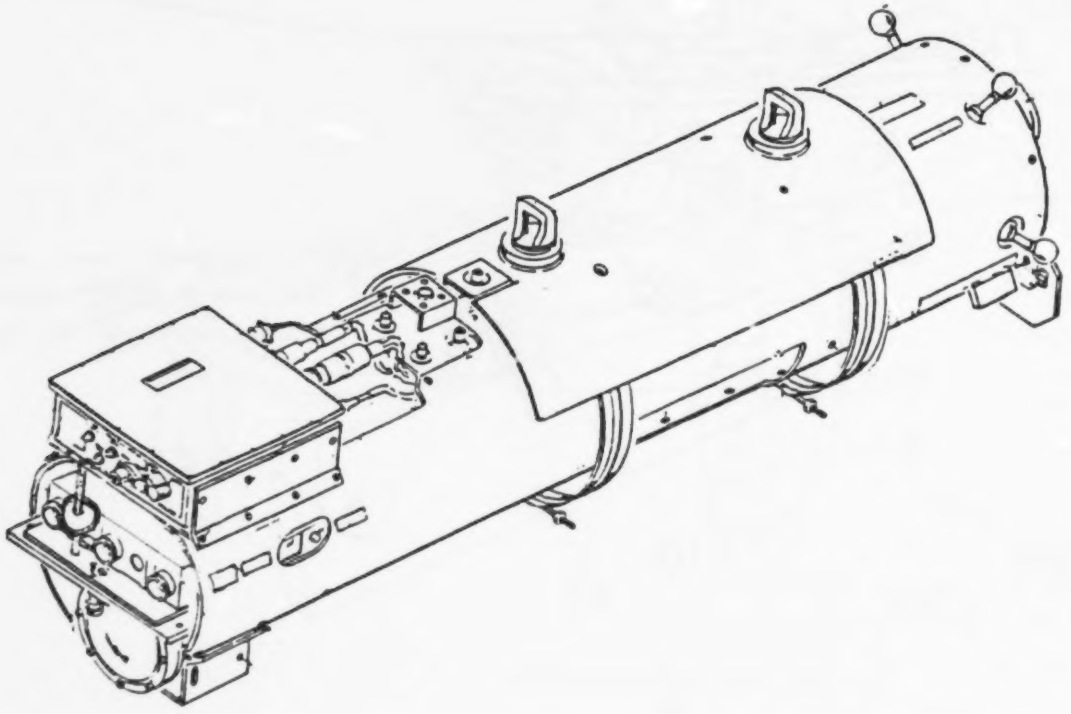


Disconnect TOW launch rack wing stub connector plug (10) and secure to fastener tape (11) on top of detector rack.

NOTE

Repeat installation procedures for other side of aircraft.

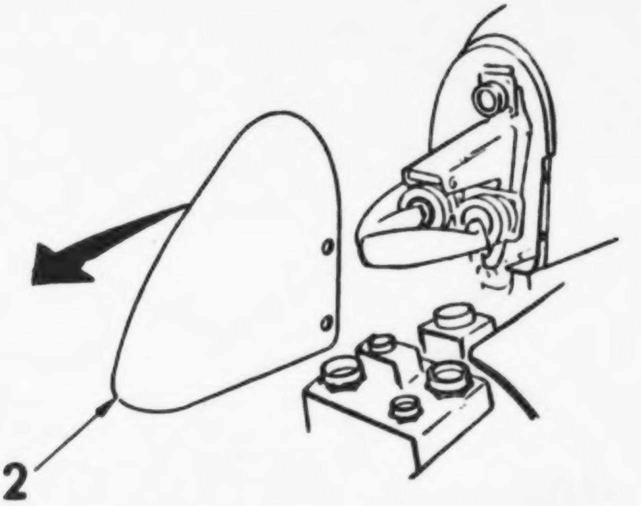
Outside Installation Task 6: Inspect Aircraft Weapon (2.75-Inch Rocket) MILES Launche Assemblies.



Inspect MILES Launcher Assemblies for any damage that would prevent normal installation or operation

Report any damage on DA Form 2404. Replace equipment only if not operable.

Outside Installation Task 7: Install Aircraft Weapon (2.75-Inch Rocket) MILES Launcher Assemblies.

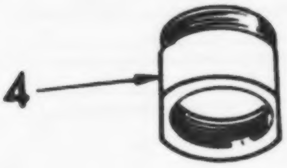


NOTE

This installation requires 2 crew members.

On AH-1S (MOD), (PROD) and (ECAS), remove front lug (1) at MILES Launcher Assembly and install spacer. Reinstall lug and complete installation.

Remove left and right front pylon nose cones (2). Install the 2.75-inch MILES Launcher Assemblies (3) in the same manner as used for installing aircraft M200 or M158 rocket pods (one on each side) (Refer to TM 9-1055-460-13&P).

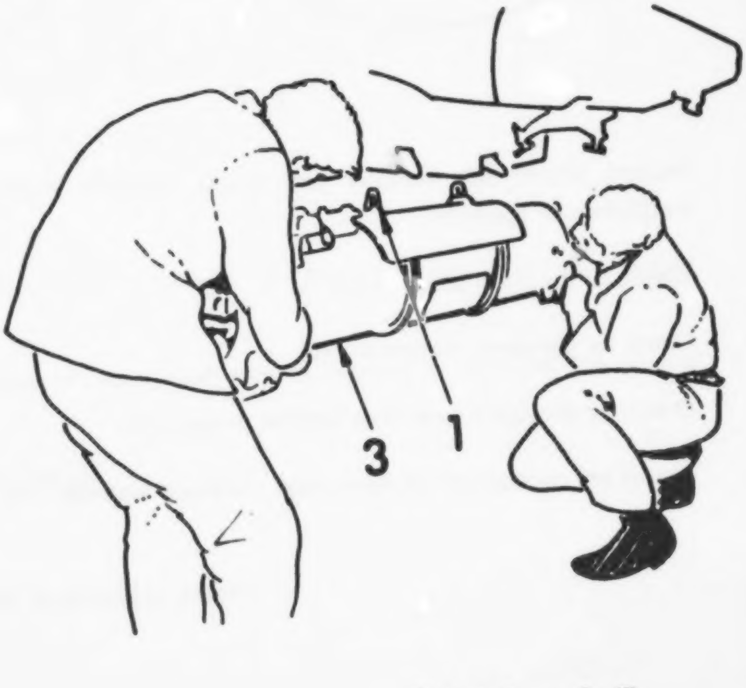


If your aircraft rocket pods are normally aligned at an elevation greater than 72 mils (miliradians), a launcher assembly spacer (4) is required. Check with your Crew Chief.

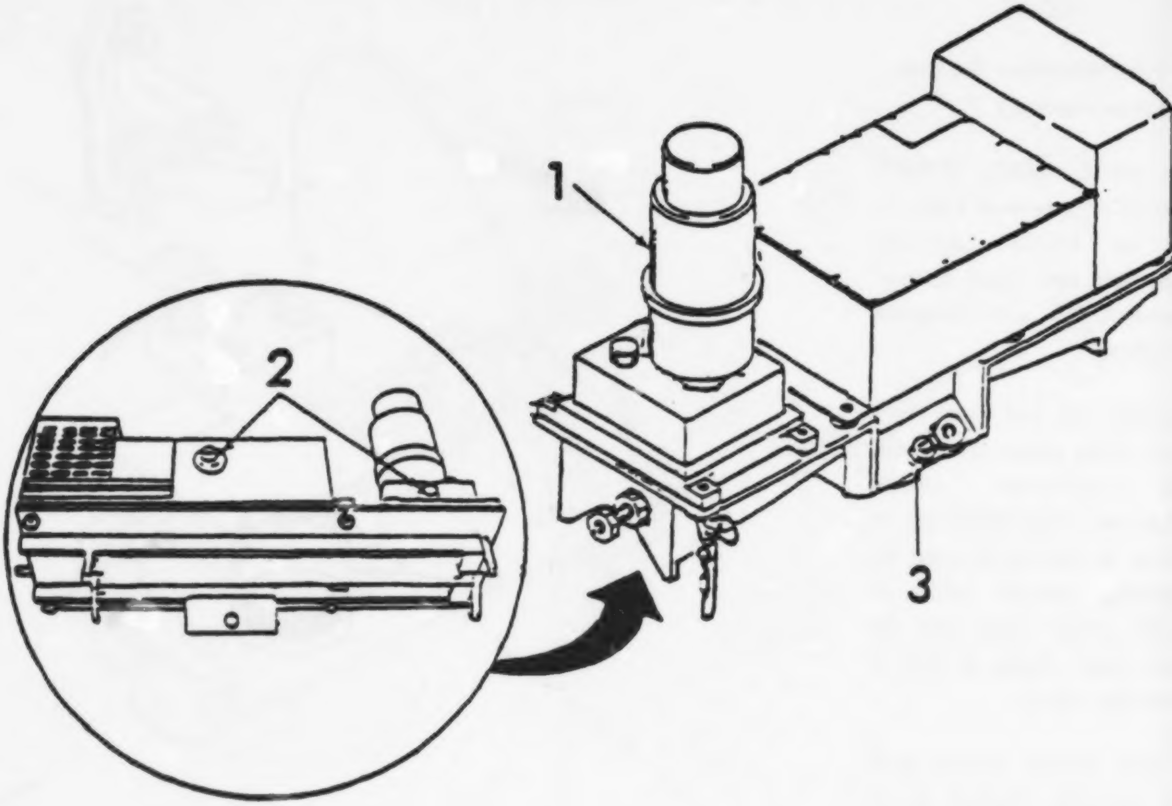
NOTE

Make sure safety pins fit in place.

Readjust sway braces and jettison plungers. Install one MILES Launcher Assembly on each side of AH-1S.



Outside Installation Task 8: Inspect Aircraft Kill Indicator and Smoke Indicator Assembly.



Inspect Aircraft Kill Indicator and Smoke Indicator Assembly for any damage that would preve installation or operation.

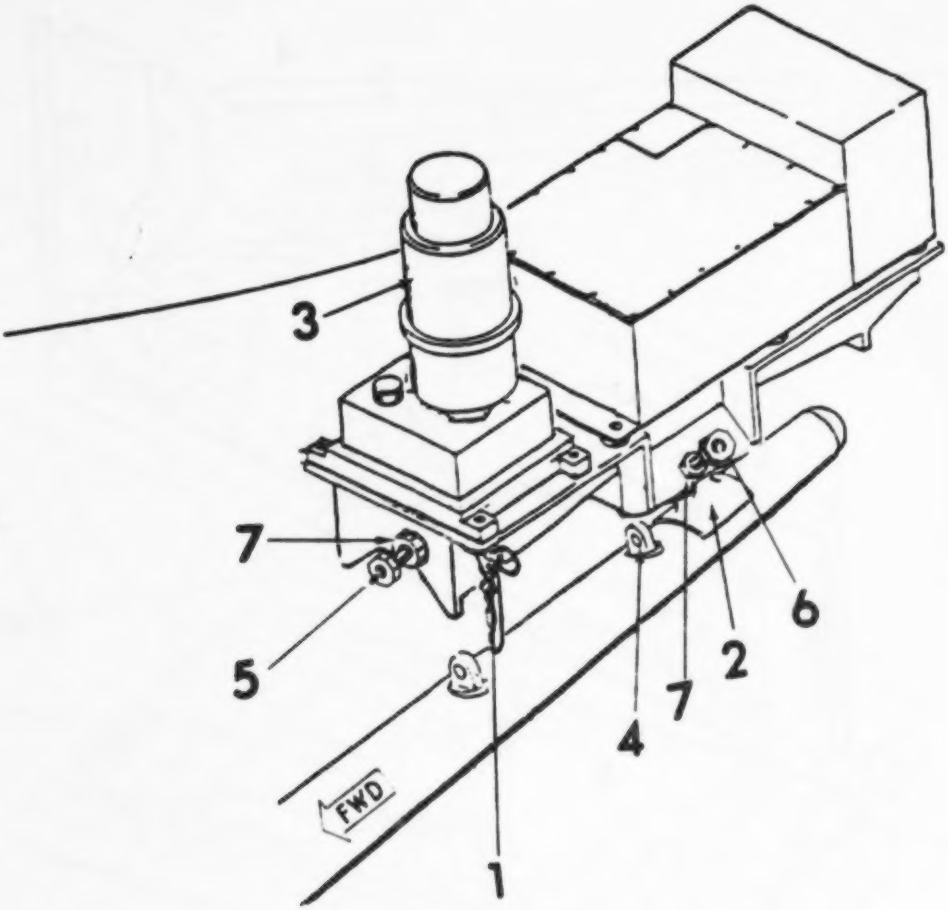
Check for cracks in plastic lens (1).

Check for damaged receptacles (2).

Check for damage to mounting bracket threads (3).

Report any damage on DA Form 2404. Replace assembly only if not operable.

Outside Installation Task 9: Install Aircraft Kill Indicator and Smoke Indicator Assembly.



Remove quick release pin (1) from assembly.

Set assembly on left skid just in front of the rear skid cross tube (2). Make sure AKI (3) is facing toward front of the AH-1S.

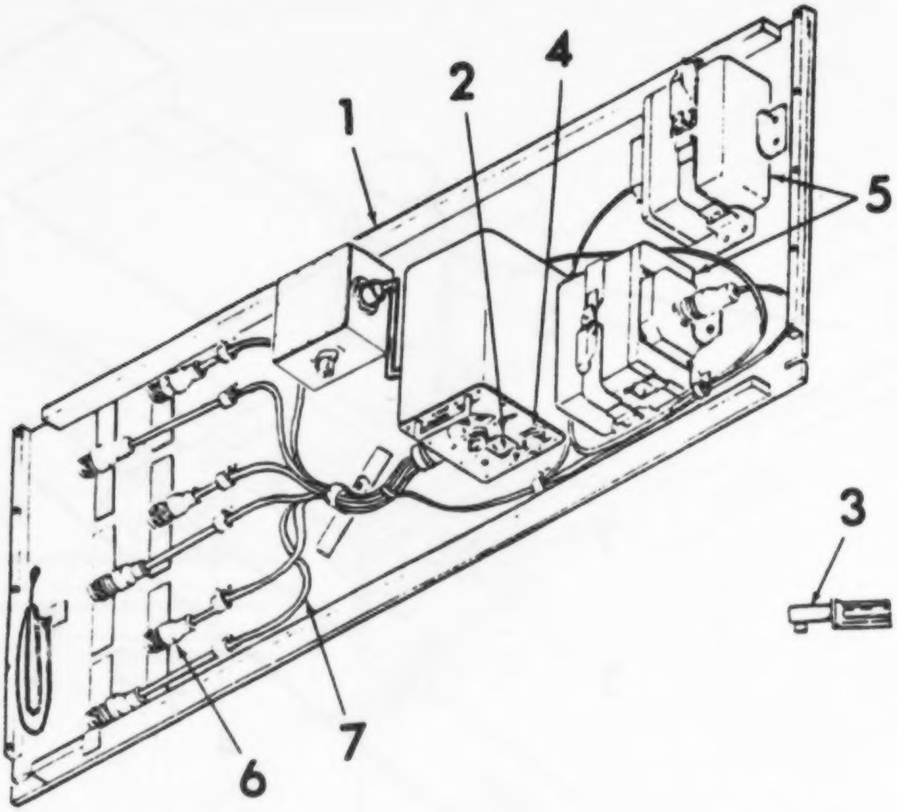
Rotate smoke platform around skid and slide toward aircraft rear to position its pins into the ground handling rings (4).

Hand tighten securing bolt (5) and sway bar bolt (6).

Tighten the two jam nuts (7).

Install quick release pin (1). Ensure that pin is completely seated.

Outside Installation Task 10: Inspect ALCA Adapter Assembly.



Inspect ALCA Adapter Assembly (1) for any damage that would prevent normal installation or operation.

Check for cracks in ALCA display window (2).

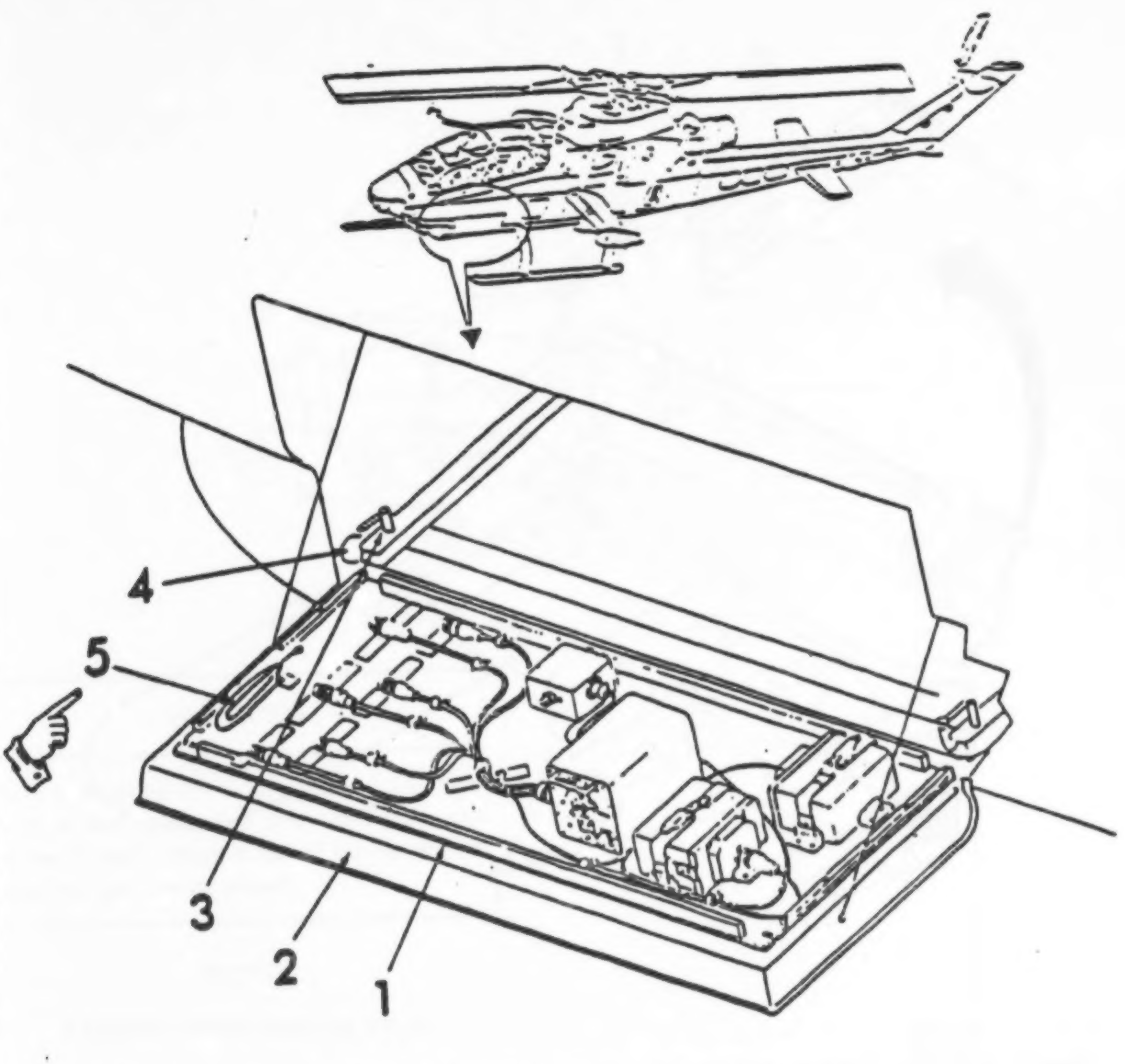
Check that Controller Key (3) turns freely in ALCA receptacle (4).

Inspect both battery boxes (5) for damage that would prevent normal use.

Check that connectors (6) and cables (7) are not damaged.

Report any damage on DA Form 2404. Replace only if assembly is not operable.

utside Installation Task 11: Install ALCA Adapter Assembly.



Position ALCA Adapter Assembly (1) on left-hand 20 mm ammunition bay door (2).

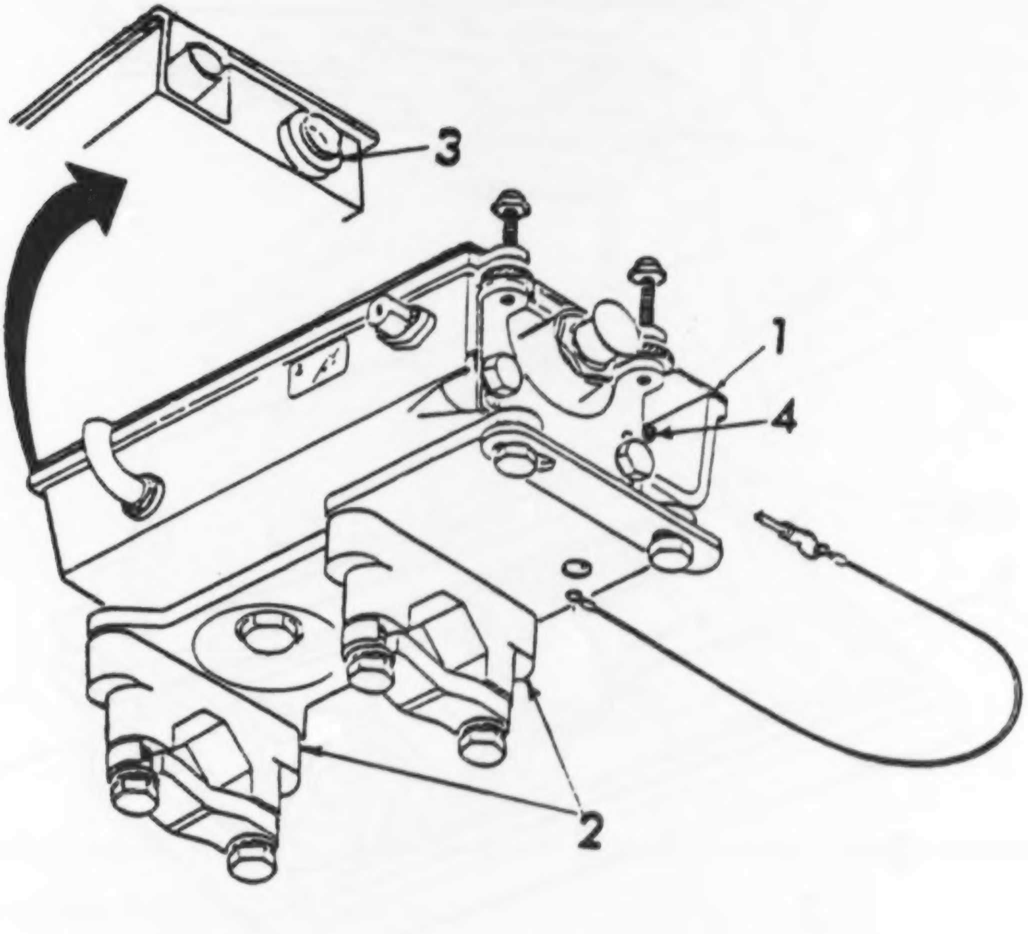
Remove the two detent pins (3) from ammunition bay track (one pin on each side).

Slide ALCA Adapter Assembly with ALCA and battery boxes into tracks (4) in 20 mm ammunition bay. Install plate assembly in same manner used to install a 20 mm ammunition box.

Replace detent pins (3) on both sides of track to secure ALCA Adapter Assembly.

Attach ground strap (5) to any convenient unpainted surface.

Outside Installation Task 12: Inspect 20 mm Cannon Laser Transmitter and Support.



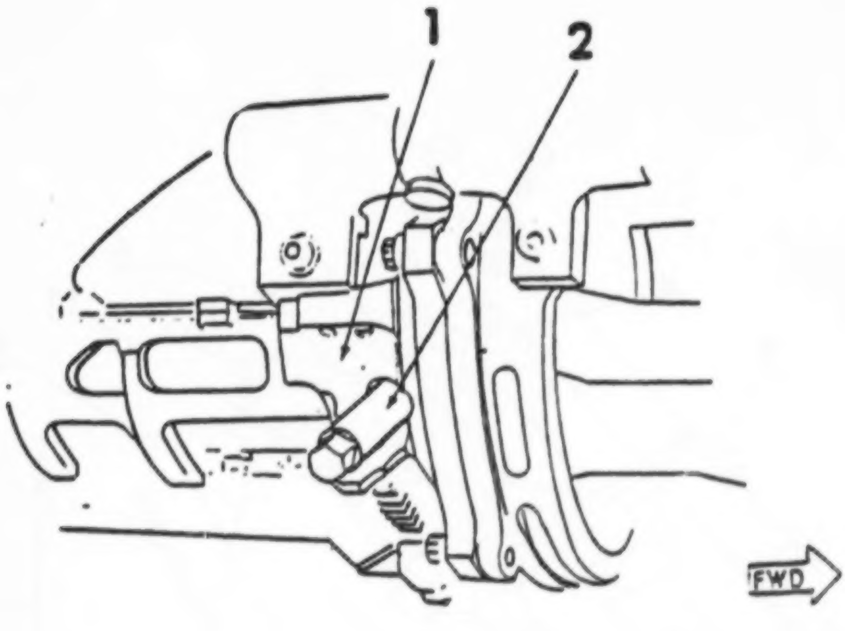
Inspect transmitter (1) and mounting brackets (2) for any damage that would prevent normal installation or operation.

Remove any dirt or oil from lens (3) with lens paper (Item 6, Section II, Appendix D) or a soft dry cloth (Item 7, Section II, Appendix D).

Look through transmitter telescope (4). Be sure you can see distant objects clearly.

Report any damage on DA Form 2404. Replace transmitter or support only if not usable.

Outside Installation Task 13: Install 20 mm Cannon Laser Transmitter.



WARNING

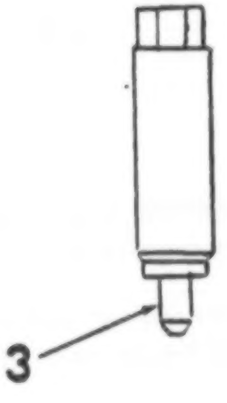
Prior to applying Power to system, clear turret area of any obstruction and warn personnel to stand clear. Erect a Safety Barrier around area that gun barrels sweep.

NOTE

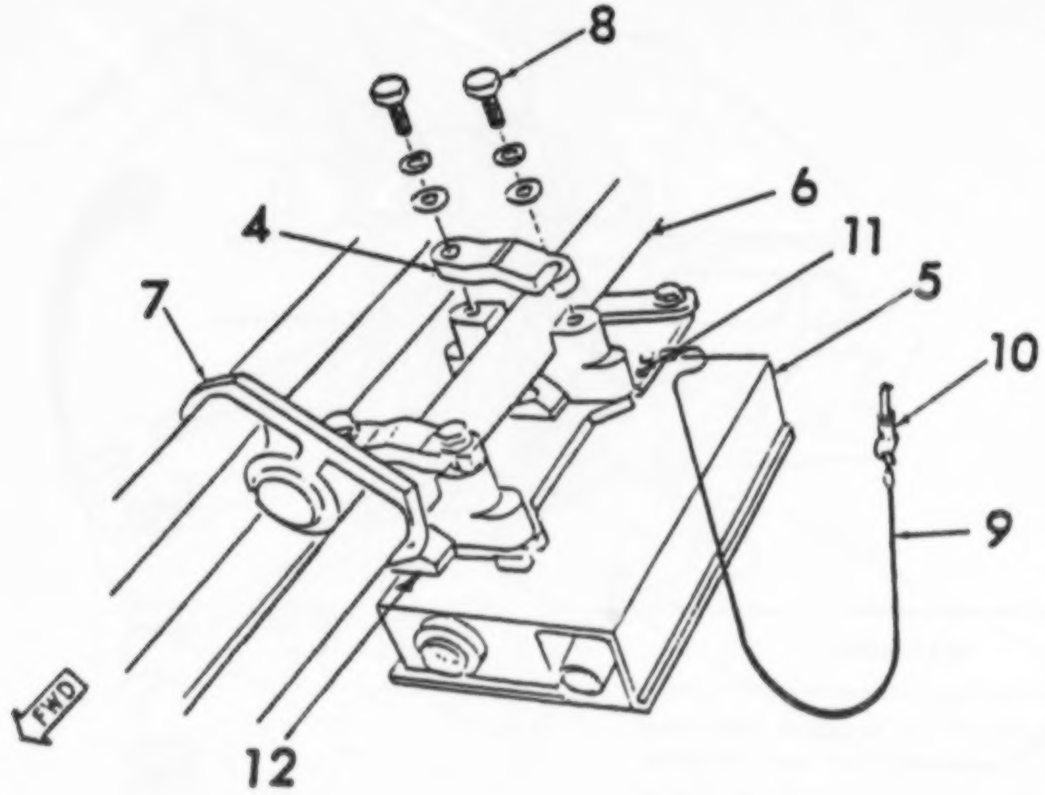
If installed, remove delinking feeder.

Remove timing pin from 20 mm receiver (1). Install MILES barrel locking plunger (2) in timing pin's hole. Turn barrel until indexing hole aligns with plunger screw (3) in plunger. Use adjustable wrench from aircraft tool kit to tighten plunger. Insure gun barrels will not rotate manually.

Retain timing pin for reinstallation following MILES training exercises



Outside Installation Task 13: Install 20 mm Cannon Laser Transmitter (Cont).

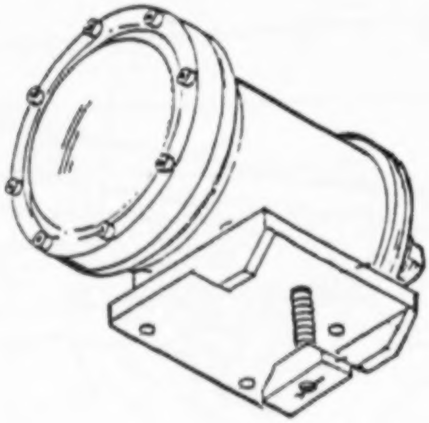


Loosen transmitter support latches (4) and slide open. Invert transmitter (5) and insert latches between two lower left side cannon barrels (6). Position behind mid-barrel clamp (7).

Close latches over left side cannon barrel. With transmitter parallel to ground, slide transmitter forward until bracket locks against mid-barrel clam with tab (12) positioned under clamp. Tighten bolts (8).

Wrap safety lanyard (9) around barrel. Attach pin (10) to bracket base hole (11).

Outside Installation Task 14: Inspect FLASHWESS.



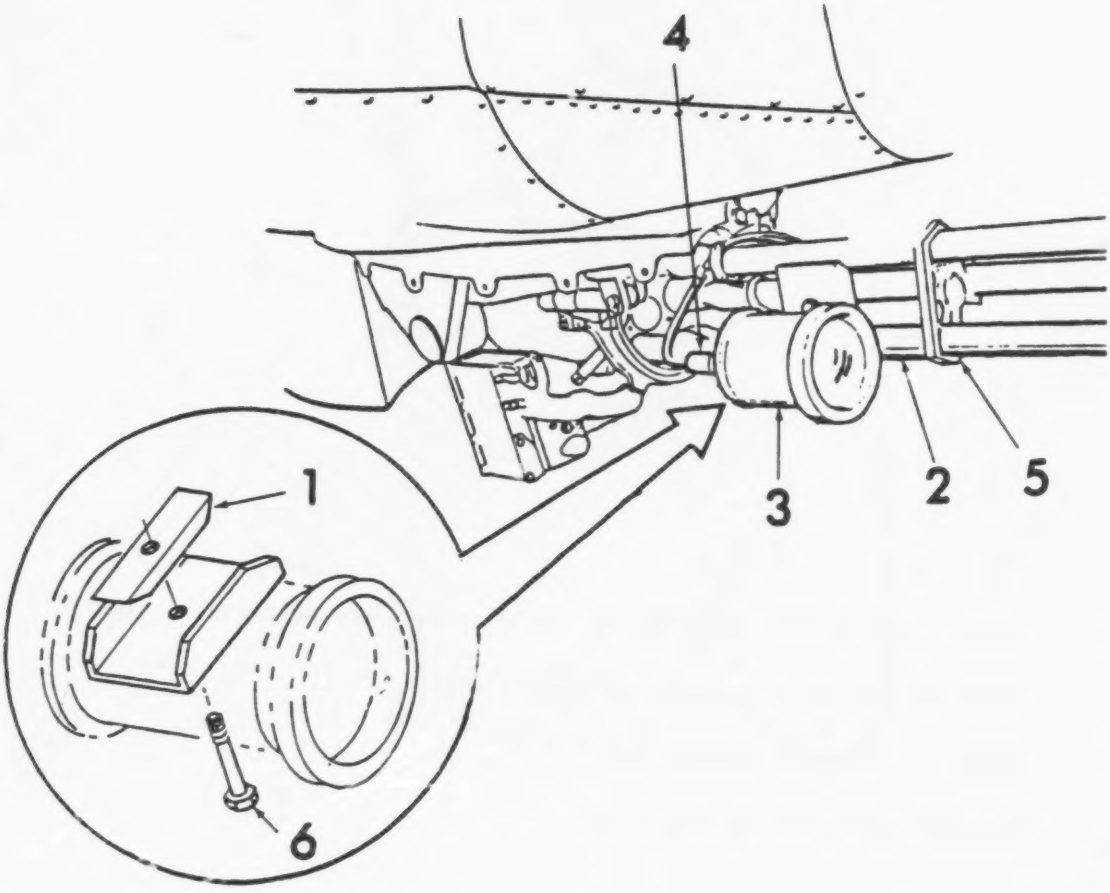
Inspect FLASHWESS for any visible damage that would prevent installation or operation.

Check that lens has no cracks and all bolts are tight.

Report any damage on DA Form 2404.

Replace FLASHWESS only if not usable.

Outside Installation Task 15: Install FLASHWESS.

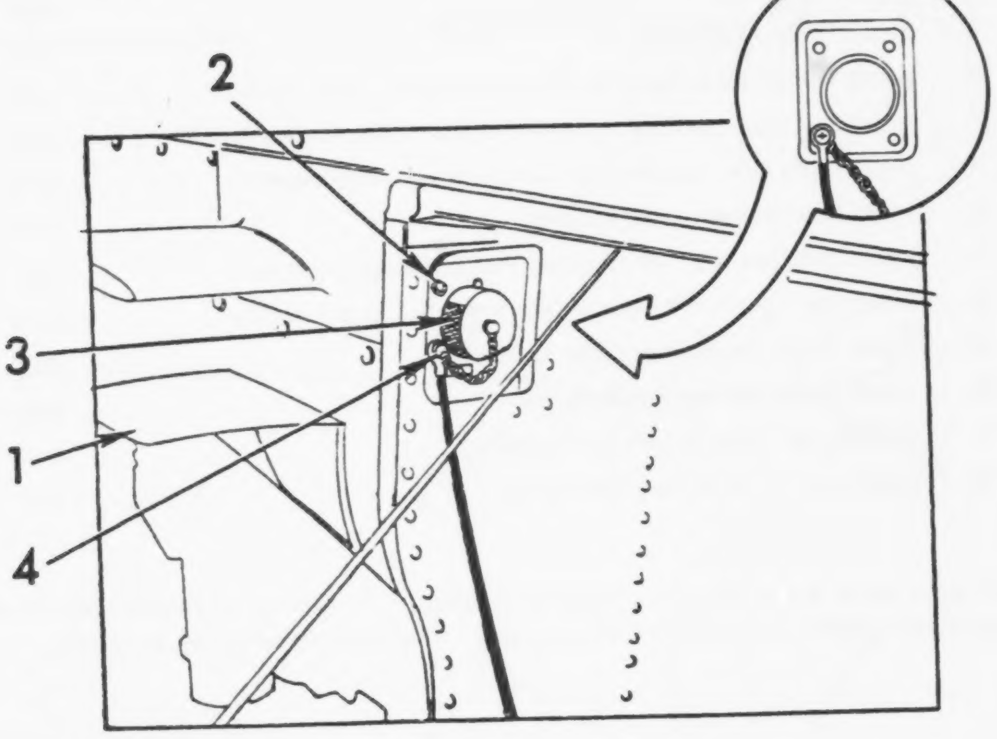


Loosen wedge (1) until it touches cotter pin. Turn wedge to fit between two cannon barrels (2) on right side.

Position FLASHWESS (3) against two barrels on right side. Make sure cable connector (4) points toward rear and FLASHWESS is behind mid-barrel clamp (5). Insert wedge between barrels.

Turn longer side of wedge perpendicular to barrels. Tighten bolt (6) using adjustable wrench from aircraft tool kit.

Outside Installation Task 16: Detach Ammunition Bay Connector.



Open left side turret access door (1).

Remove four screws (2) holding 20J322 connector to ammunition bay wall. Retain screws for reinstallation following MILES exercises.

Attach dust cap safety strap and ALCA ground strap (4) to lower hole, using one existing connector screw and nut.

Install dust cap (3) on 20J322 connector.

OUTSIDE CABLE INSTALLATION TASKS - LIST

Task	Title	Page
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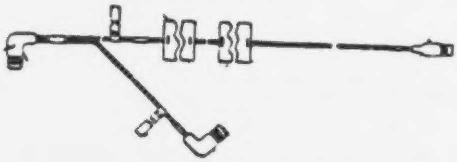
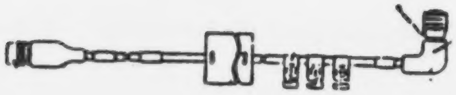
2.	Inspect Cable Assemblies	2-61
3.	Install Aircraft Kill Indicator and Smoke Indicator Cable Assembly	2-62
4.	Install Left Side Launcher to ALCA Interface Cable Assembly	2-65
5.	Install Right Side Launcher to ALCA Interface Cable Assembly	2-70
6.	Install Sail Detector Cable Assembly	2-77
7.	Install Left Side TOW Detector and Interface Cable Assembly	2-81
8.	Install Right Side TOW Detector and Interface Cable Assembly	2-85
9.	Install 20 mm Transmitter Cable Assembly	2-89
10.	Install ALCA Interface Cable Assembly	2-93
11.	Inspect Left Turret Access Door Spacer	2-96
12.	Install Left Turret Access Door Spacer	2-97

Outside Cable Installation Task 1: Obtain Equipment. Completion of Outside Cable Installation Tasks require the equipment listed and illustrated below. Obtain and set aside this equipment.

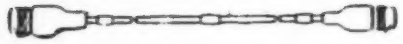
1 AKI/Smoke Indicator Cable Assembly



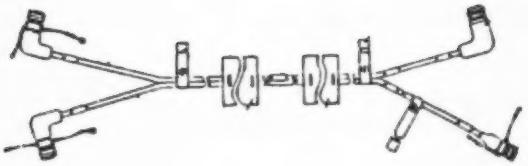
2 Launcher to ALCA Interface Cable Assemblies



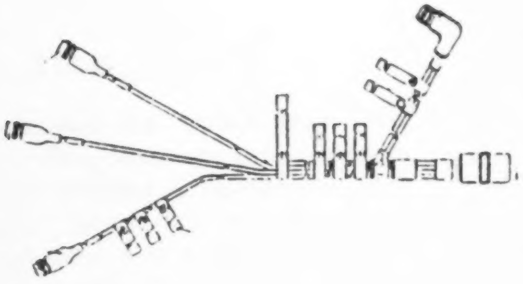
1 Sail Detector Cable Assembly



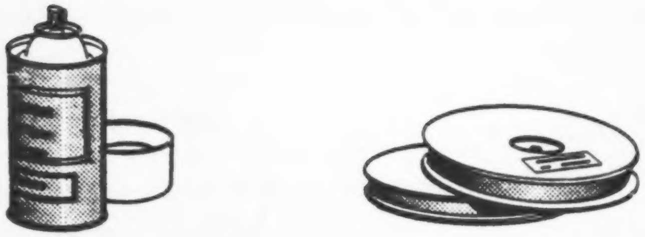
2 TOW Detector and Interface Cable Assemblies



1 20 mm Transmitter Cable Assembly

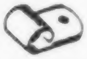


1 Installation Kit - 1 can primer and 1 roll fastener tape (For resupply of either item, see Appendix D)

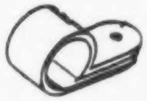


Outside Cable Installation Task 1: Obtain Equipment (Cont).

10 MS21919-WCG6 Cable Clamps

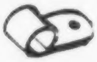


2 MS21919-WCG11 Cable Clamps



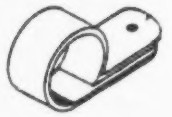
and

11 MS21919-WCG5 Cable Clamps



and

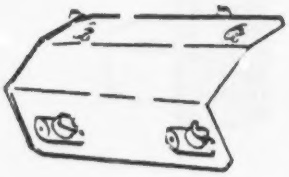
4 MS21919-WCG13 Cable Clamps



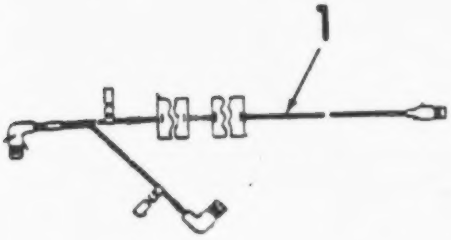
NOTE

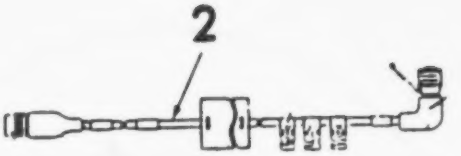
Many of the Outside Cable Installation Tasks require the use of various sizes of cable clamps. All of the clamps have a basic part number of MS21919-WCGXX. The dash number indicates the size of the clamp. Installation of all the clamps require the removal of a screw and its replacement with another screw supplied with the MILES equipment. The part number for the screw used for all the clamps is MS 51958-65. Make sure that all screws removed from the aircraft are stored in a safe place because they must be replaced when the MILES equipment is removed from the aircraft.

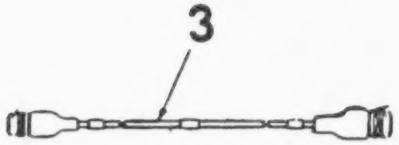
1 Door Spacer

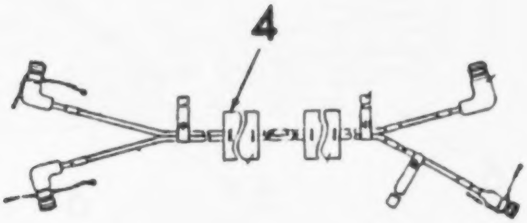


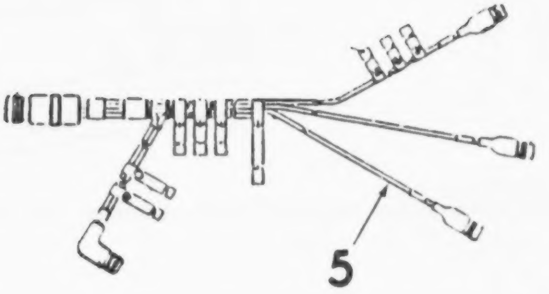
Outside Cable Installation Task 2: Inspect Cable Assemblies.









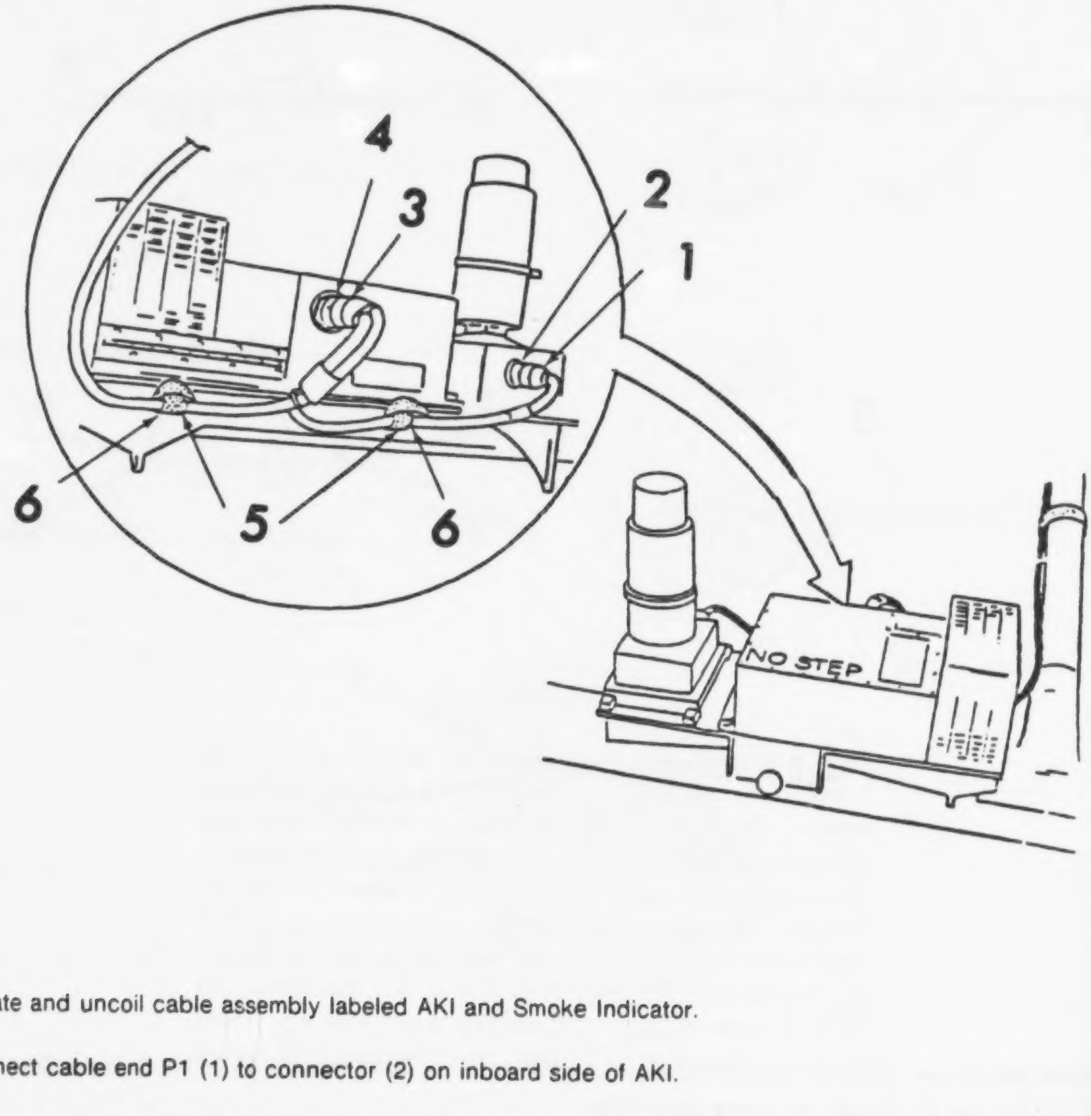


Inspect AKI/Smoke Indicator (1), Launcher/ALCA Interface (2), Sail Detector (3), TOW Detector/Interface (4), and 20 mm Transmitter (5) cable assemblies.

Check that all connectors and connector pins are undamaged.

Report any damage on DA Form 2404. Replace cable assemblies only if not usable.

Outside Cable Installation Task 3: Install Aircraft Kill Indicator and Smoke Indicator Cable Assembly.

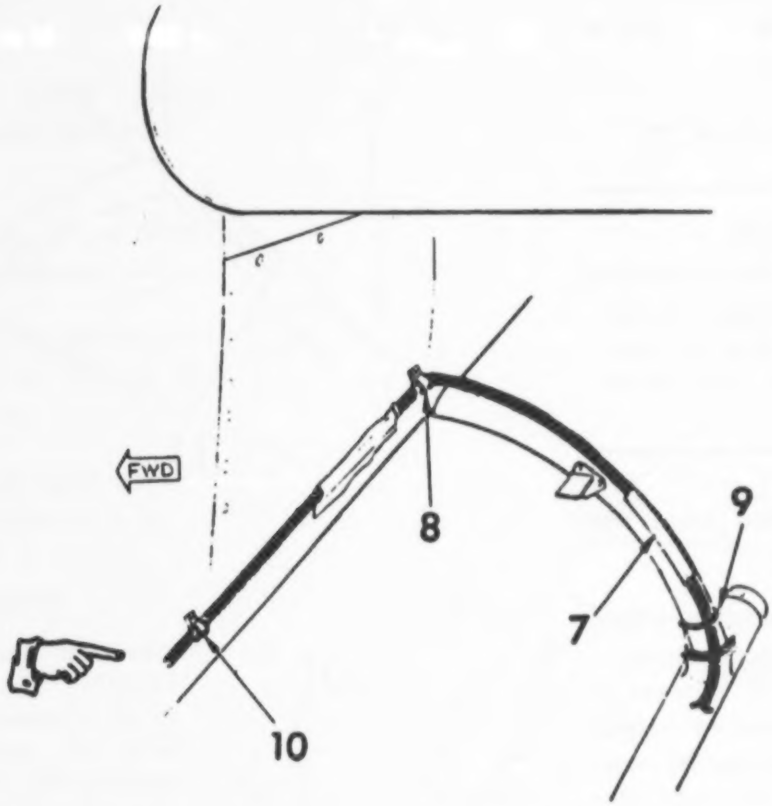


Locate and uncoil cable assembly labeled AKI and Smoke Indicator.

Connect cable end P1 (1) to connector (2) on inboard side of AKI.

Connect cable end P3 (3) to connector (4) on inboard side of smoke assembly.

Secure cable by slipping the two fastener straps (5) on inboard side of AKI/Smoke Assembly through slots (6) and wrapping them around cable.



Route cable up cross tube (7). Install a MS21919-WCG6 cable clamp over cable and secure to fuselage at top (8) of cross tube.

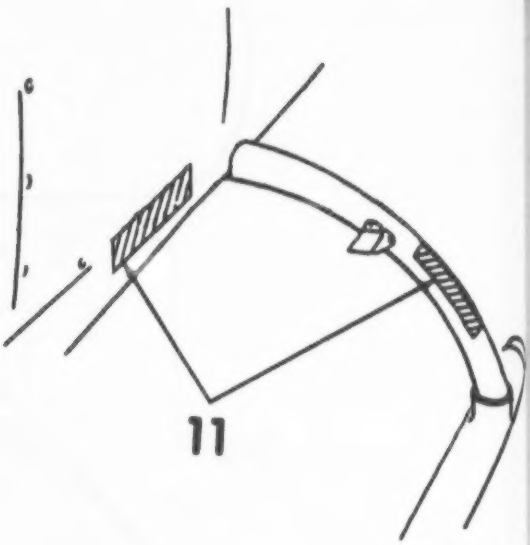
Attach fastener strap around cross tube at bottom (9). Do not tighten clamp screws yet. Retain aircraft screws for reinstallation following MILES exercises.

Install a MS21919-WCG11 cable clamp over cable just above fuselage lower panel (10). Secure cable clamp to fuselage. Do not tighten clamp screws yet. Retain aircraft screws for reinstallation following MILES exercises.

Outside Cable Installation Task 3: Install Aircraft Kill Indicator and Smoke Indicator Cab Assembly (Cont).

Mark location of cable pads (11) on cross tube and fuselage.

Temporarily move cable out of way.

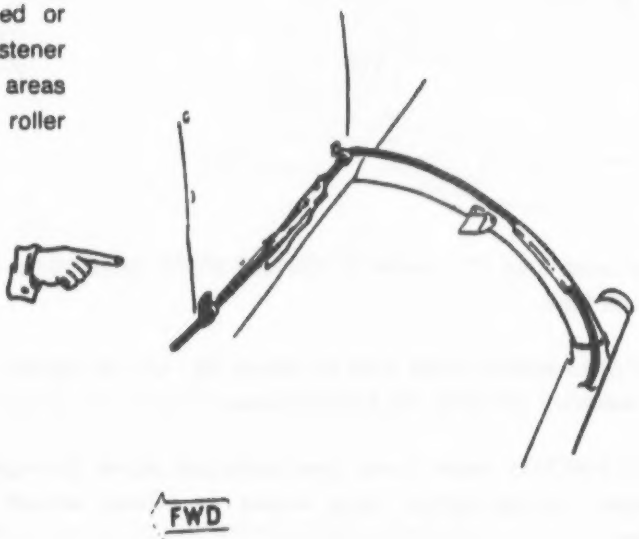


WARNING

Primer is highly flammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.

Clean and coat marked areas with spray primer.

Cut two lengths of fastener tape slightly longer than areas marked. Some of clamps may have to be loosened or removed in order to install the fastener tape. Center tape over marked areas and press tape very hard with roller (Item 7, Appendix C).



Press cable fastener pads against tape just installed. Reinstall cable clamps if necessary. Secure tighten all cable clamp screws.

Temporarily leave the remaining length of AKI/Smoke Indicator cable on ground.

Outside Cable Installation Task 4: Install Left Side Launcher to ALCA Interface Cable Assembly.

Locate and uncoil cable assembly labeled LAUNCHER – ALCA INTFC.

Connect 21A9 P2 LH .INBR RKT SQ (1) to Launcher J5 (2).

Connect aircraft XM-18 pod connector 21A11 P1 (3) to Launcher J3 (4).

Connect MILES cable connector P2 (5) to Launcher J1 (6).

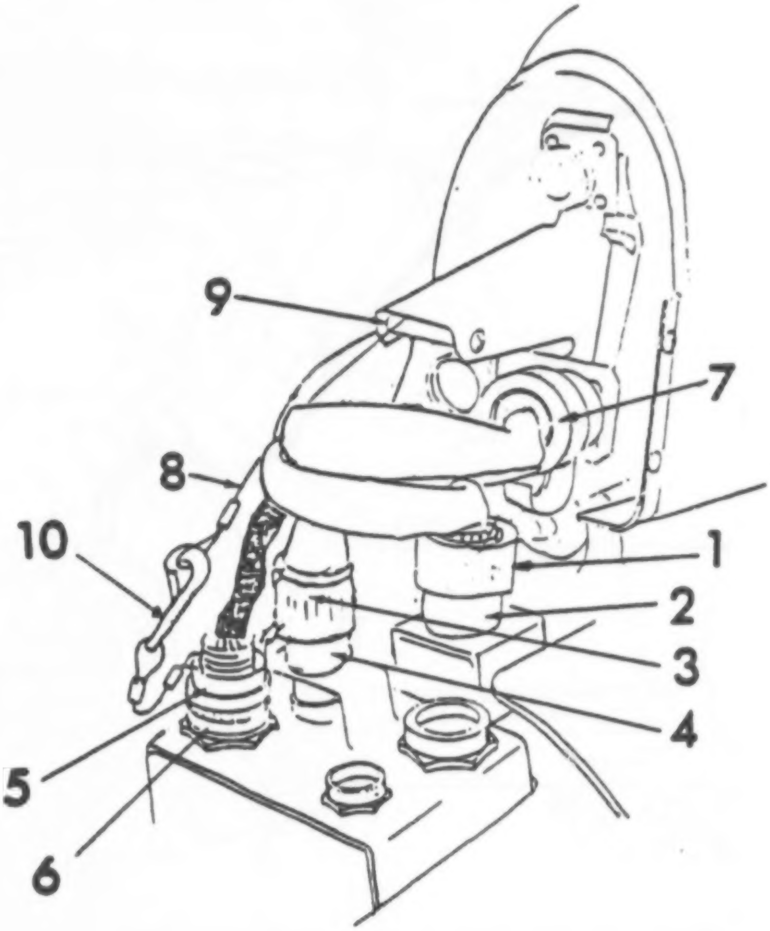
NOTE

If necessary, disconnect LH INBOARD ROCKET FUSES connector (7) to gain access to other connectors, and reconnect after task is complete.

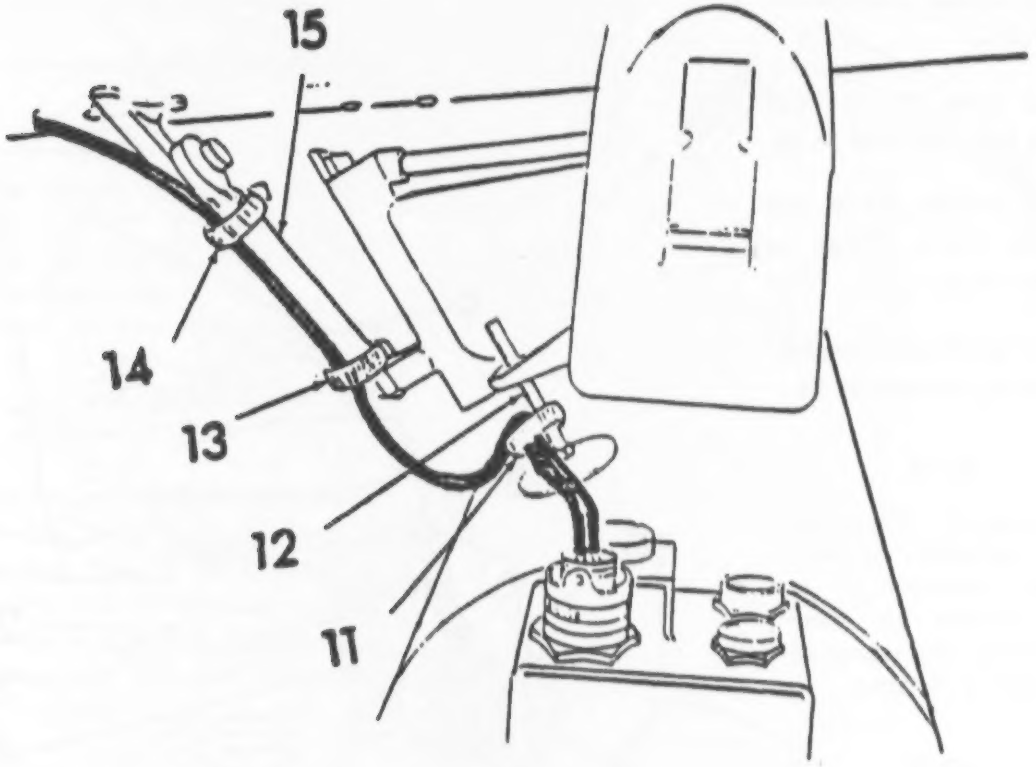
NOTE

If wing stub does not appear as shown, secure lanyards (8) in same manner as existing lanyads.

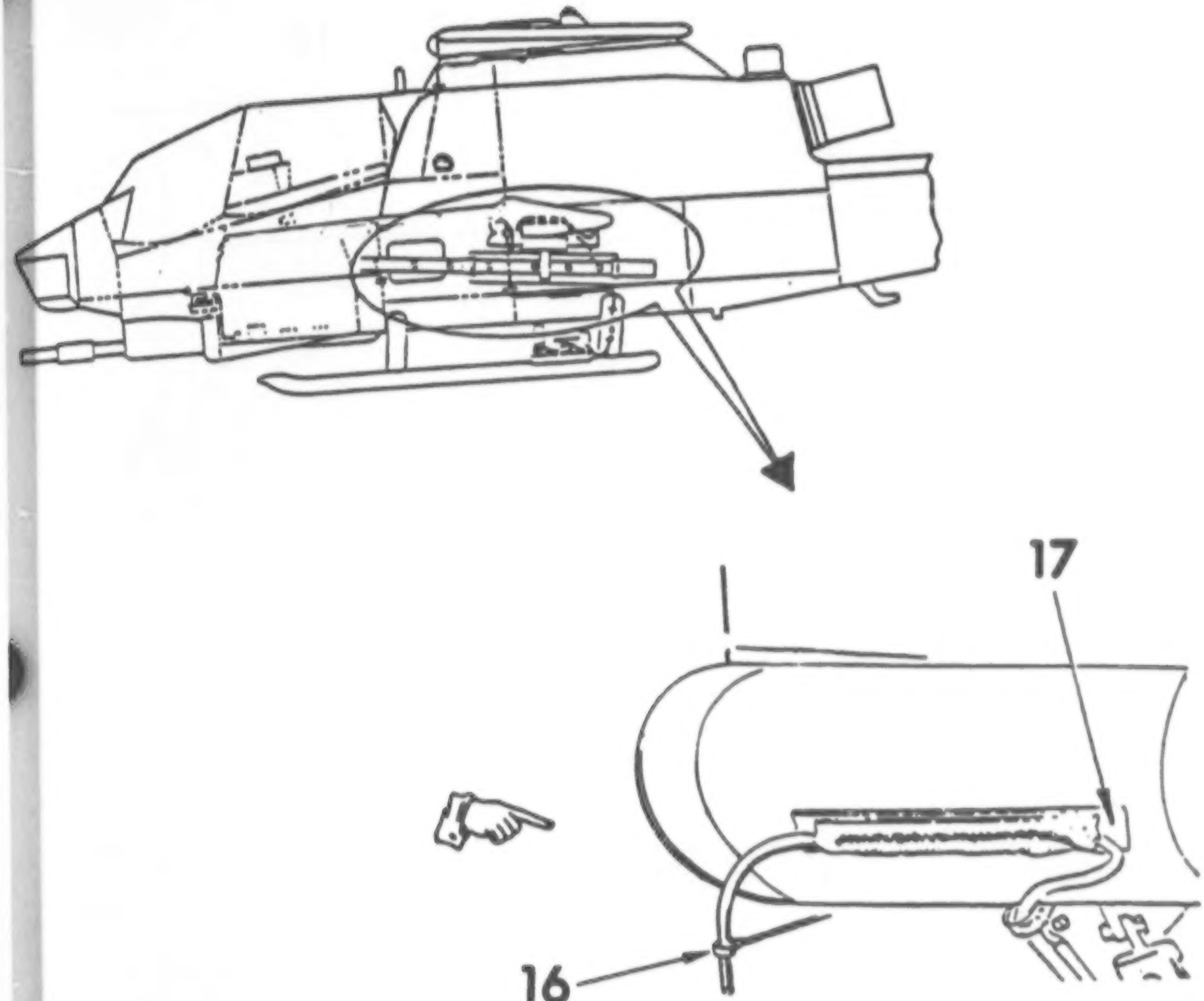
Install lanyards (8) through inboard wing stub station securing post (9) and attach to lanyard clip (10).



Outside Cable Installation Task 4: Install Left Side Launcher to ALCA Interface Cab Assembly (Cont).



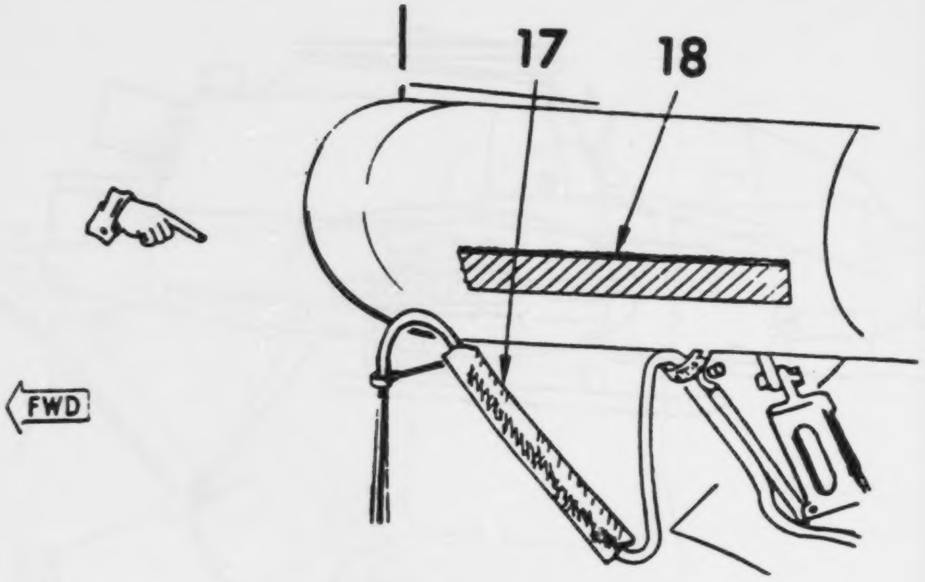
Secure with three fastener straps attached to cable. Wrap first strap (11) around forward inboard sway brace (12). Wrap the second (13) and third (14) straps around jettison plunger support arm (15).



Position cable along bottom leading edge of wing stub. Attach a MS21919-WCG6 cable clamp (16) around the cable. Fasten clamp to fuselage near wing stub. Replace aircraft screw with clamp fastener screw. Do not tighten clamp screw.

Mark cable pad (17) location.

Outside Cable Installation Task 4: Install Left Side Launcher to ALCA Interface Cab Assembly (Cont).

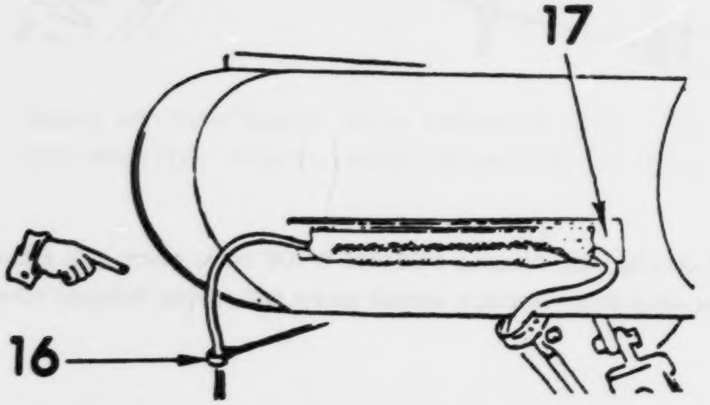


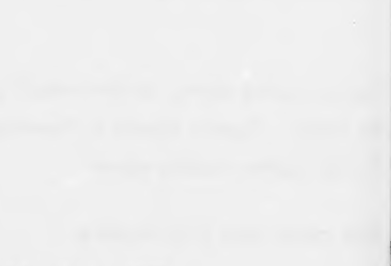
WARNING

Primer is highly flammable. Do not spray near heat, sparks, or open flame. No Smoking. Use only in well-ventilated area.

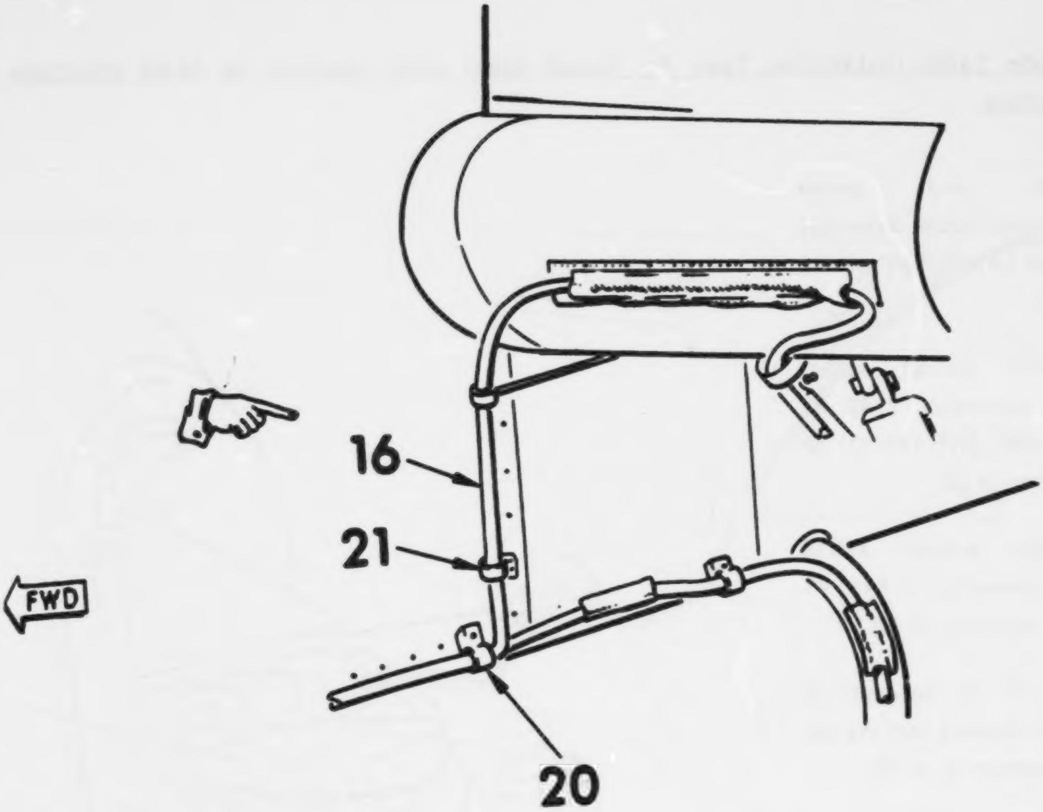
Clean and coat previously marked area with spray primer.

Cut a length of fastener tape slightly longer than fastener pad (17). Install tape (18) on location marked. Press hard with hand roller (19) (Item 7, Appendix C).





Press fastener pad (17) and cable against tape. Replace and tighten cable clamp (16).



Remove previously installed clamp (20). Insert launcher cable (16) in clamp and reattach clamp (20) to side of fuselage.

Install another MS21919-WCG6 cable clamp (21) on the launcher cable. Attach clamp to fuselage. Tighten clamps.

Leave the remaining lengths of cable on ground.

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Outside Cable Installation Task 5: Install Right Side Launcher to ALCA Interface Ca Assembly.

Locate and uncoil remaining cable assembly labeled LAUNCHER – ALCA INTFC.

Connect aircraft rocket squib connector 21A9 P2 RH INBR RKT SQ (1) to launcher J5 (2).

Connect aircraft XM-18 pod connector 21A11 P1 (3) to launcher J3 (4).

Route P2 (5) between J5 (2) and forward locking lug and connect to J1 (6).

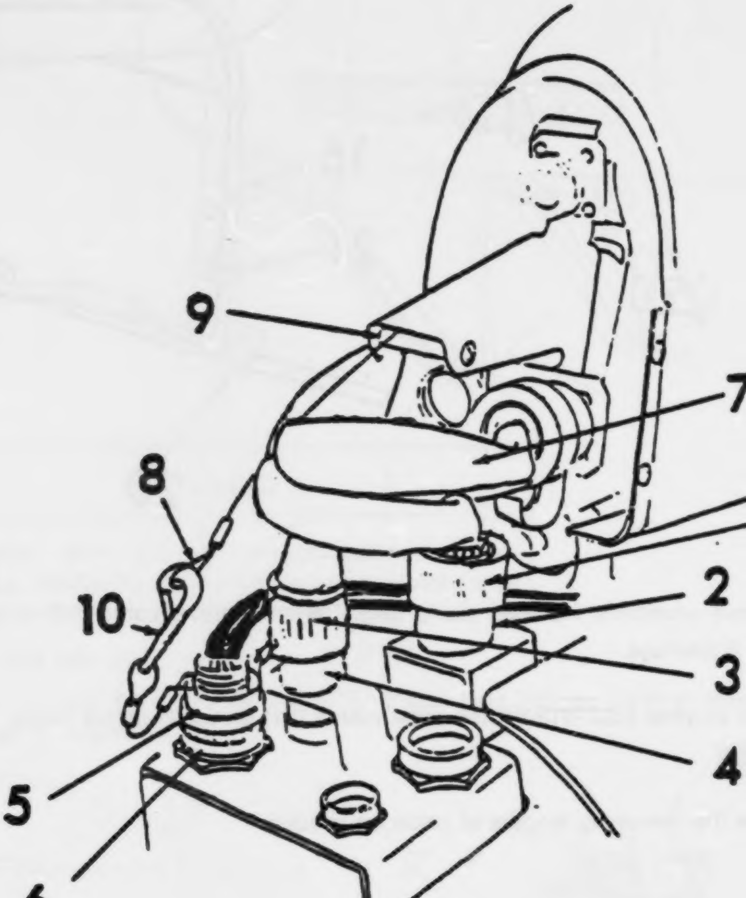
NOTE

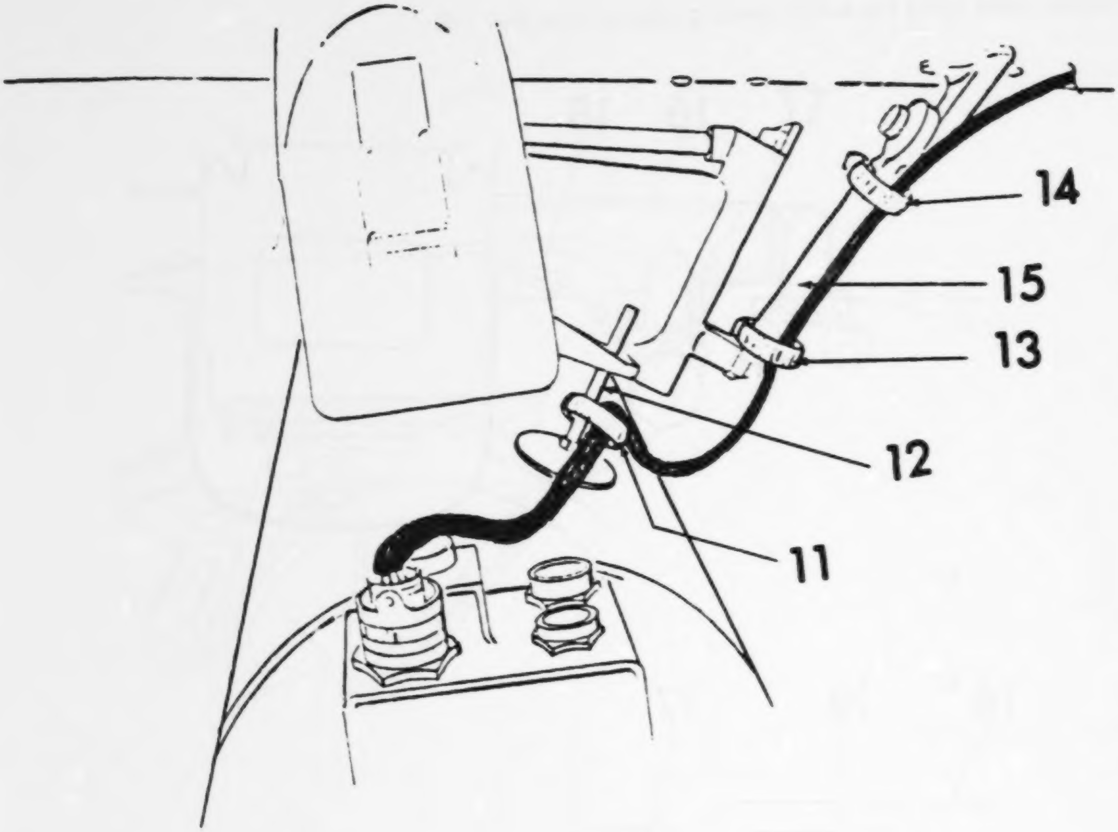
If necessary, disconnect RH INBOARD ROCKET FUSES connector (7) to gain access to other connectors. Reinstall connector.

Install lanyards (8) through inboard wing stub station securing post (9) and attach to lanyard clips (10).

NOTE

If wing stub does not appear as shown, secure lanyards (8) in the same manner as existing lanyards.

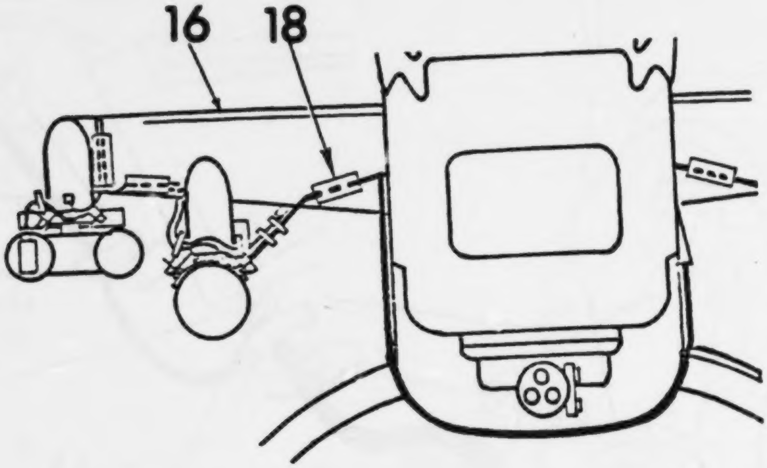


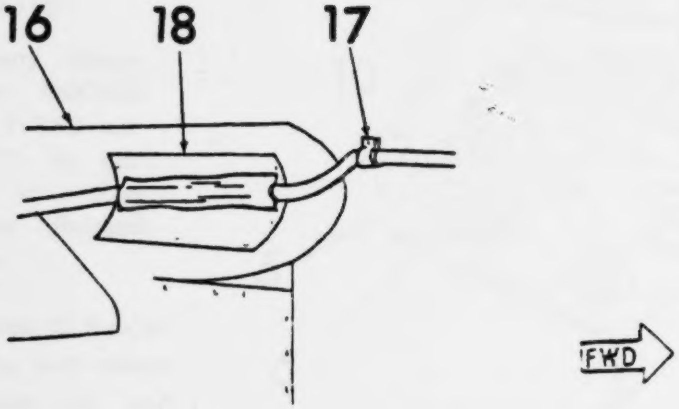


Secure with three fastener straps attached to cable. Wrap first strap (11) around forward inboard sway brace (12), wrap second (13) and third (14) straps around jettison plunger support arm (15).

Outside Cable Installation Task 5: Install Right Side Launcher to ALCA Interface Cabl Assembly (Cont).

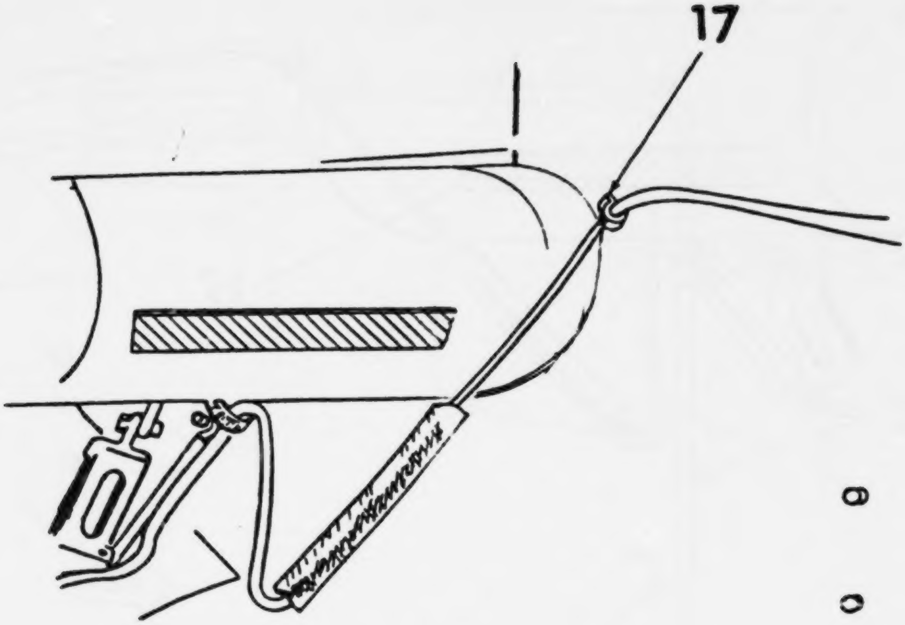
Position cable along the bottom leading edge of wing stub (16).





Secure a MS21919-WCG6 cable clamp (17) around cable. Fasten to fuselage near wing stub (16). Retain aircraft screw for reinstallation following MILES exercises. Do not tighten clamp.

Mark cable pad (18) location.



WARNING

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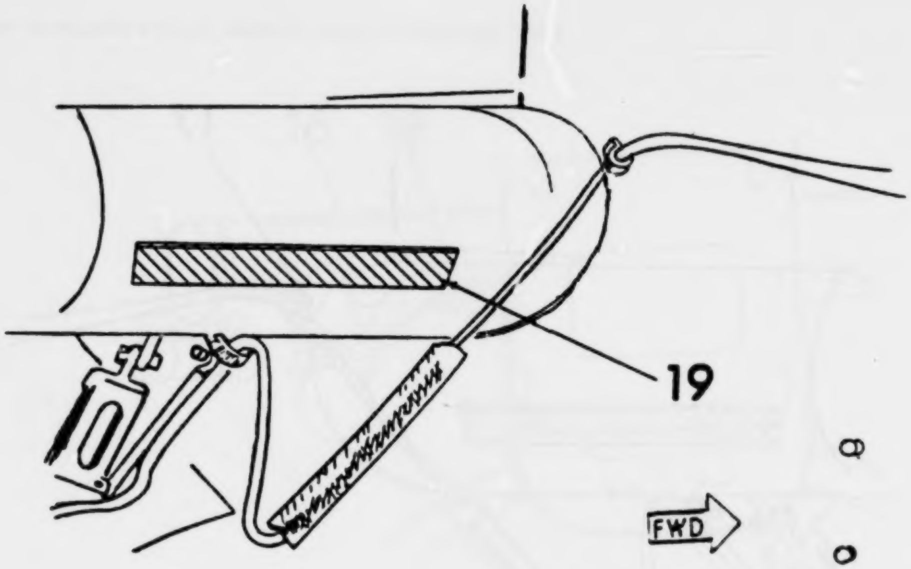
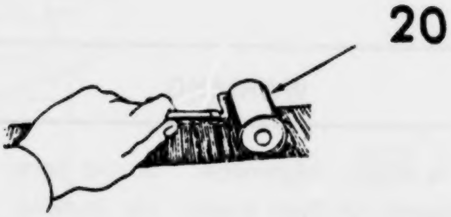
Move cable and cable pad out of way. Temporarily remove cable clamp (17) if necessary. Clean and coat previously marked area with spray primer.

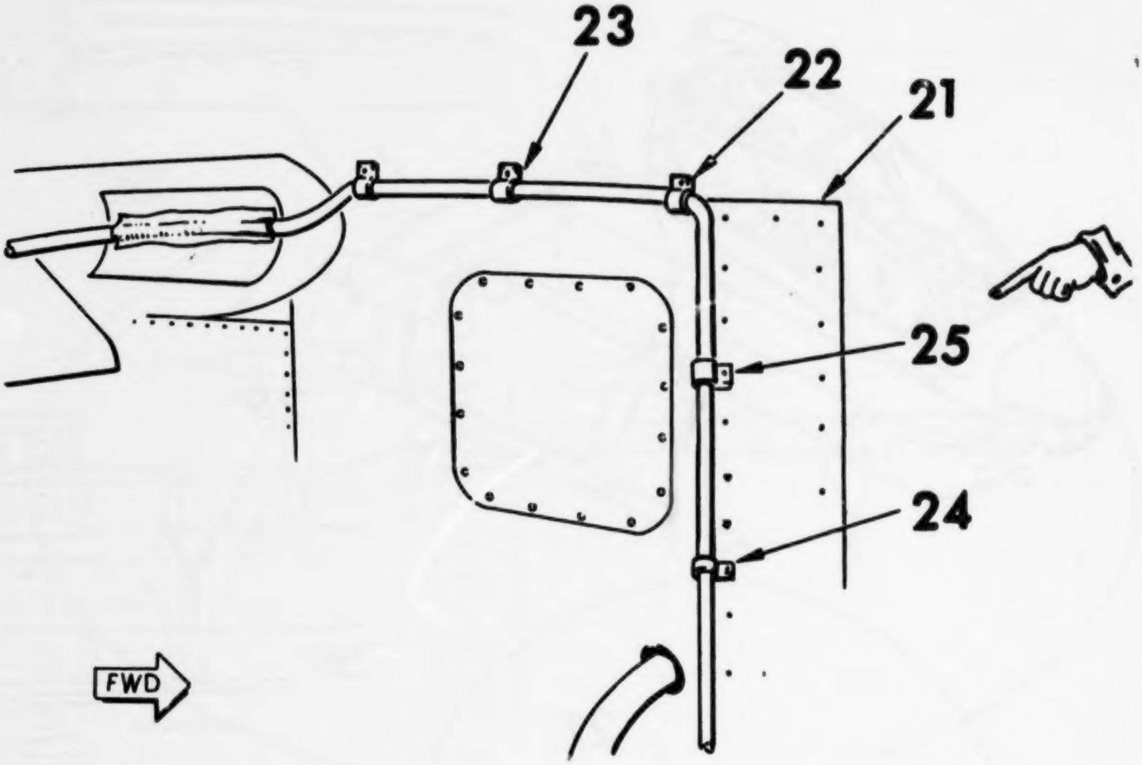
Outside Cable Installation Task 5: Install Right Side Launcher to ALCA Interface Assembly (Cont).



Cut a length of fastener tape slightly longer than fastener pad. Install tape (19) on location marked.
very hard with roller (20) (Item 7, Appendix C).



Press fastener pad and cable to tape, and tighten the cable clamp.



Route cable forward. Position along fuselage panel edges (21) even with wing stub leading edge.

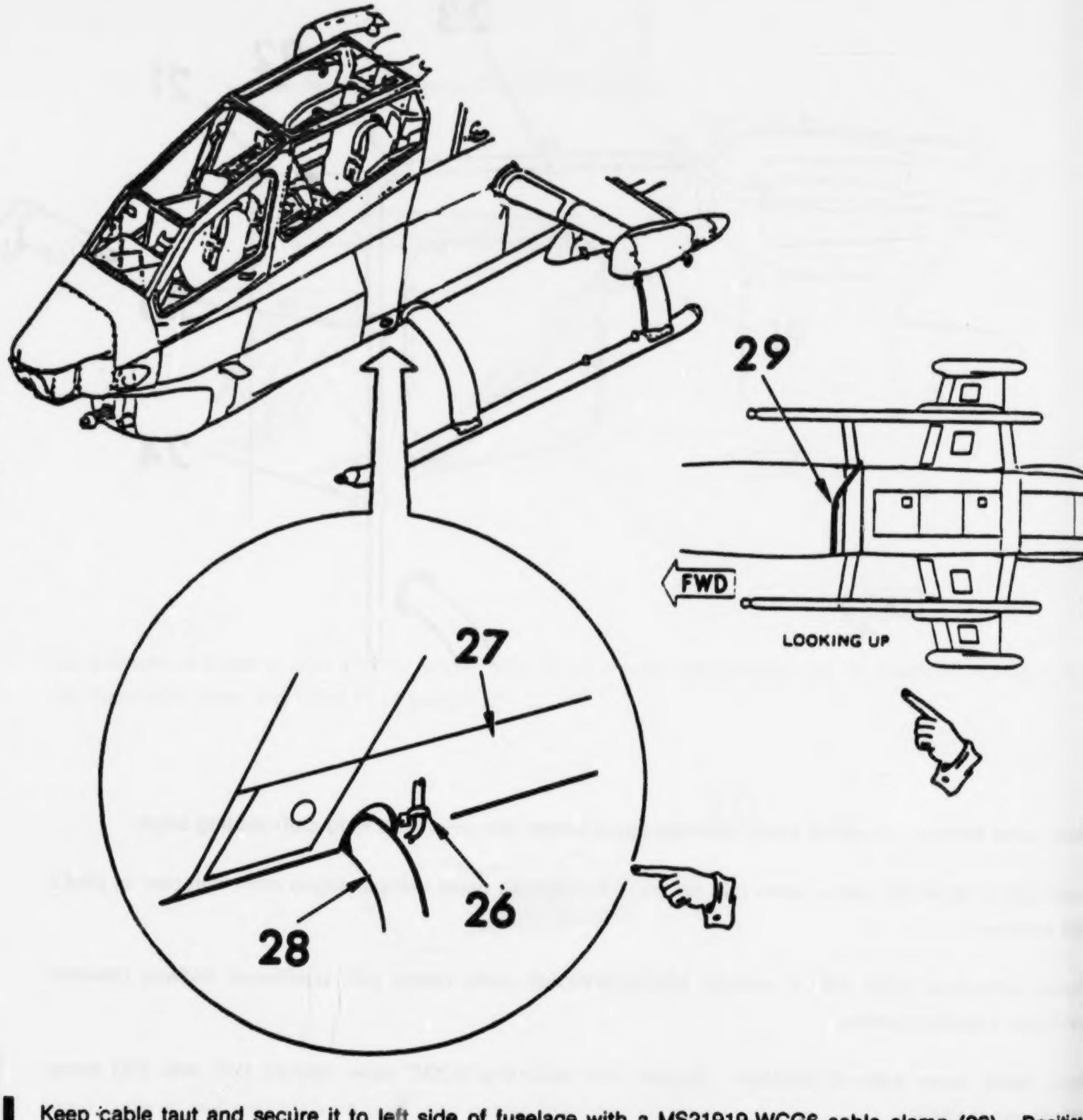
Install MS21919-WCG6 cable clamp (22) on cable at fuselage panel vertical edges even with rear of pilot's right window.

Secure horizontal cable with a second MS21919-WCG6 cable clamp (23) positioned midway between previously installed clamps.

Route cable down side of fuselage. Secure with MS21919-WCG6 cable clamps (24) and (25) along vertical panel edges.

Route cable under fuselage to left side.

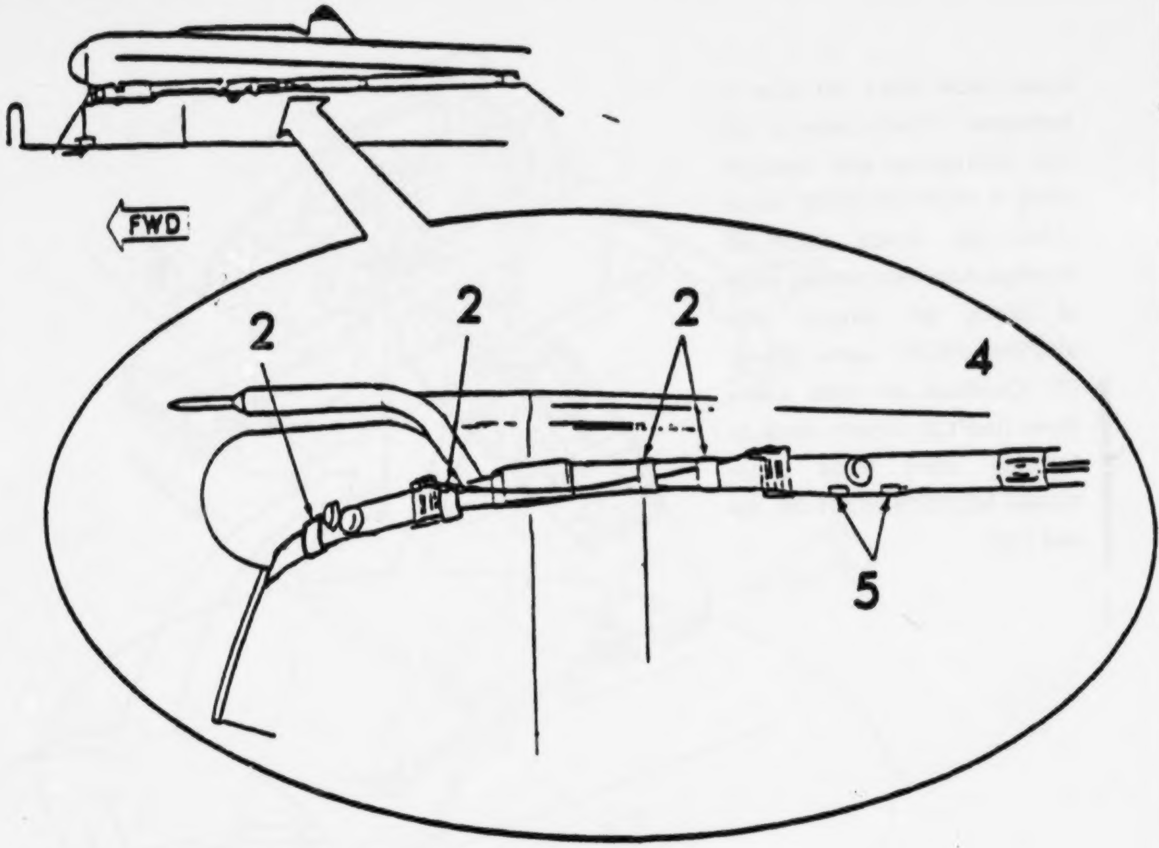
Outside Cable Installation Task 5: Install Right Side Launcher to ALCA Interface Cab
Assembly (Cont).



Keep cable taut and secure it to left side of fuselage with a MS21919-WCG6 cable clamp (26). Positio
clamp along vertical panel edge (27) just aft of forward cross tube (28). Install another MS21919-WCG
cable clamp (29) on bottom of fuselage to retain cable. Use existing aircraft bolt to secure clamp.

Temporarily leave remaining lengths of cable on ground.

Outside Cable Installation Task 6: Install Sail Detector Cable Assembly.



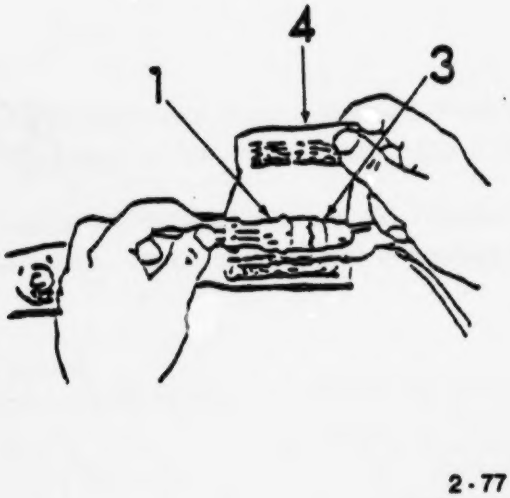
Locate and uncoil cable assembly labeled SAIL DETECTOR – ALCA INTFC.

Pull plug P2 (1) through elastic keepers (2) on sail detector belt.

Connect P2 to sail detector connector (3).

Secure protective flap (4) over connector.

Route cable along bottom edge of detector belt. Secure to detector belt using the four fastener tabs (5). The detector belt tabs prevent the cable from riding over belt and blocking detectors. Make sure the cable is NOT underneath the belt.

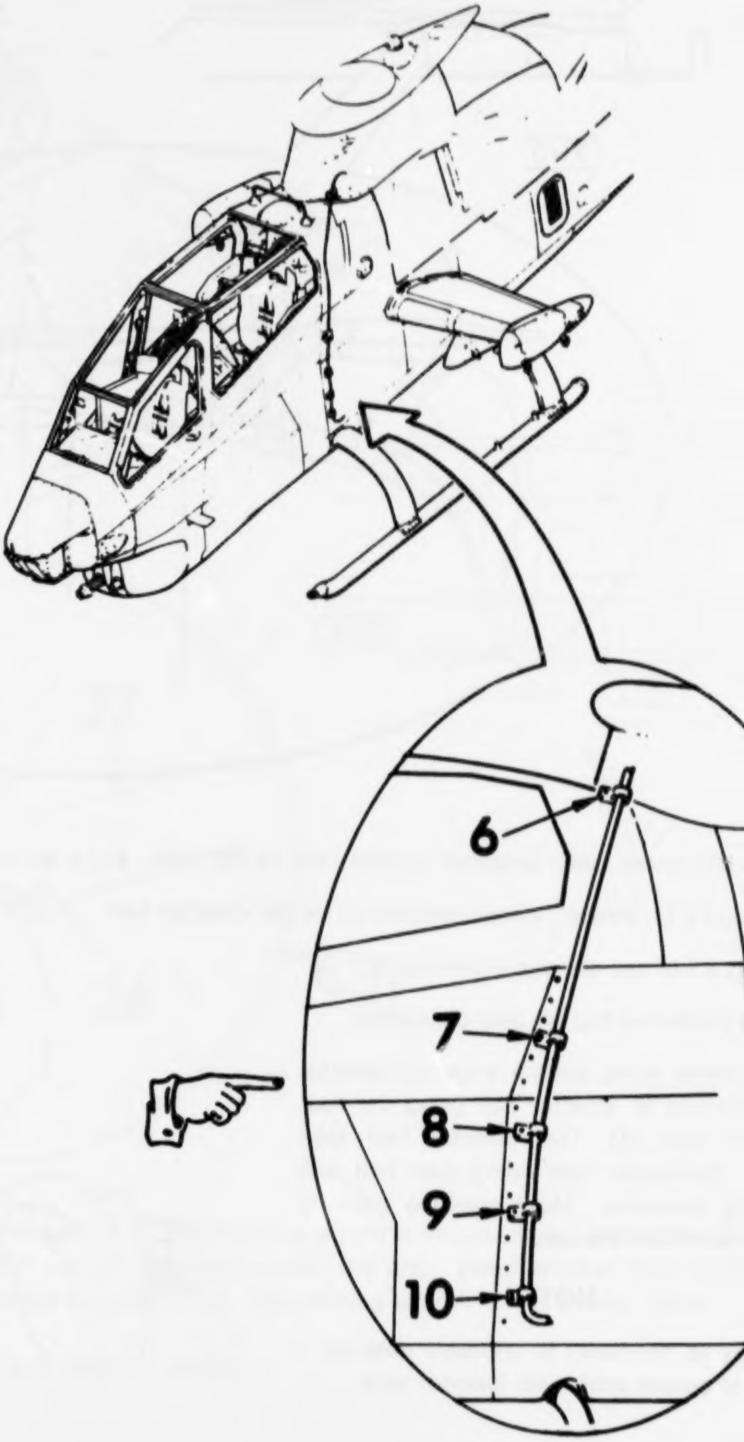


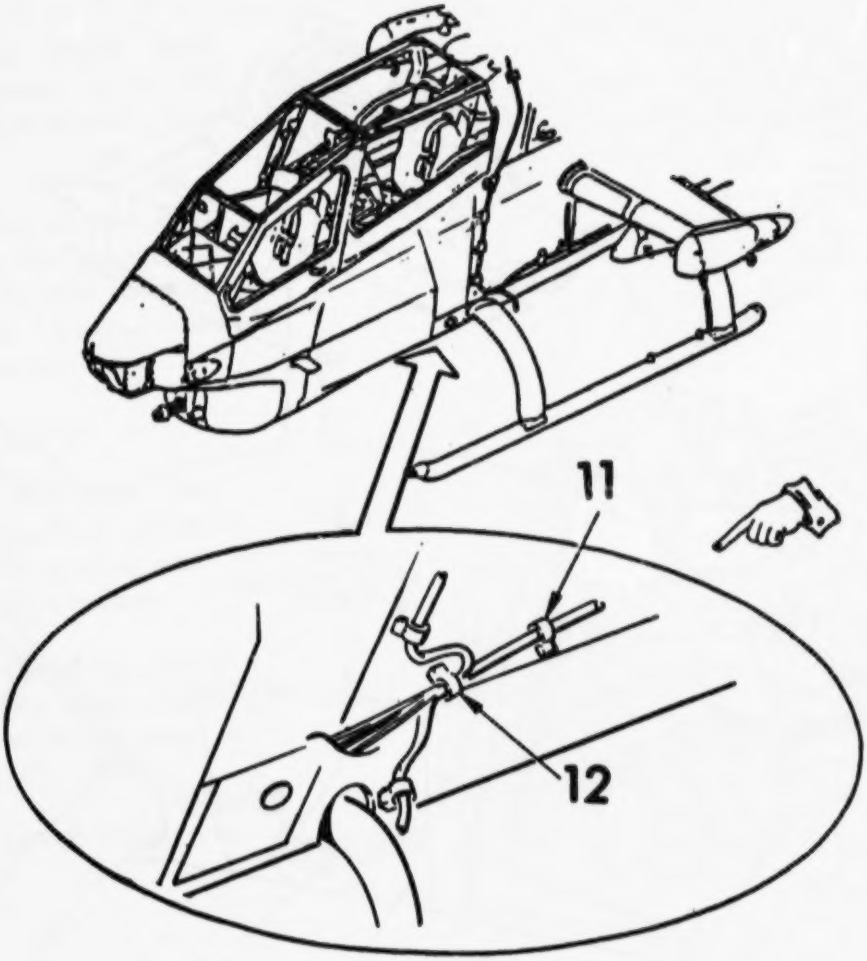
NOTE

It may be necessary to unbuckle detector belt to secure cable with fastener tabs.

Outside Cable Installation Task 6: Install Sail Detector Cable Assembly (Cont).

Route cable down left side of helicopter. Attach cable to sail near intersection with fuselage using a MS21919-WCG6 cable clamp (6). Attach cable to fuselage near rear bottom edge of pilot's left window with MS21919-WCG6 cable clamp (7). Continue to route cable down fuselage. Attach cable to fuselage using three cable clamps MS21919-WCG5 (8), (9) and (10).



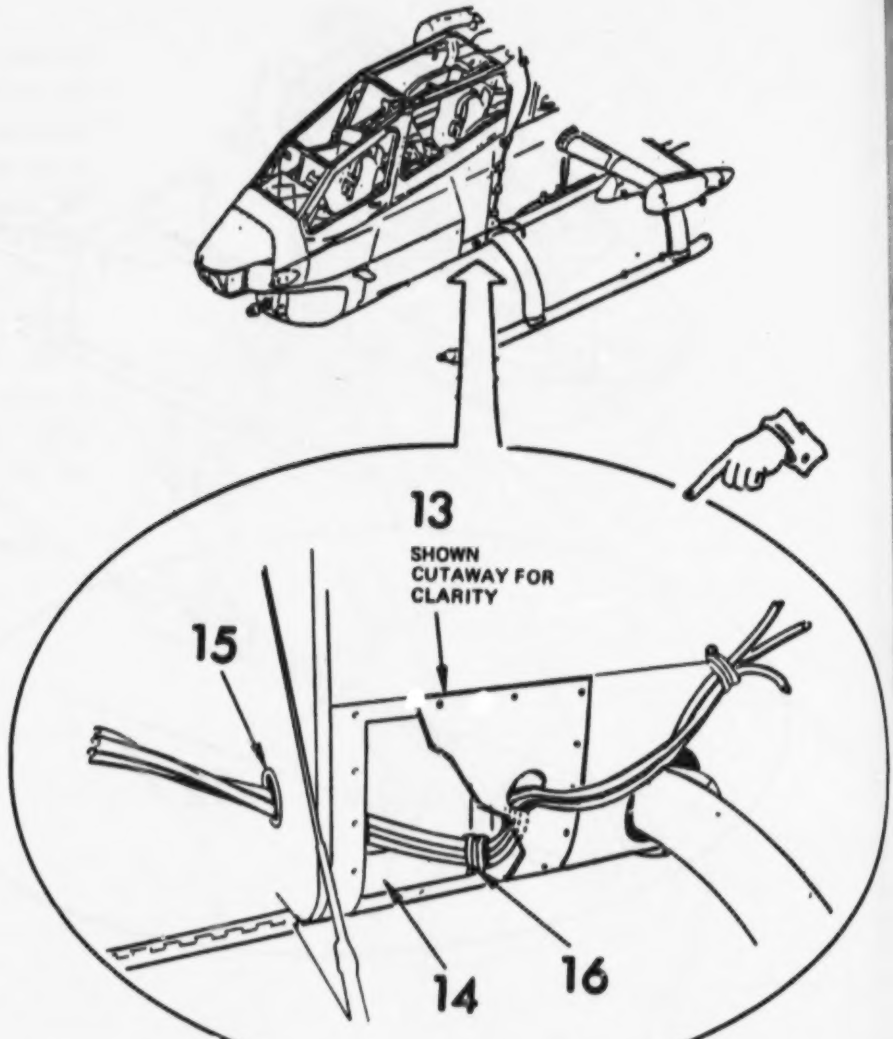


Gather up free ends of left side launcher cable and AKI/Smoke cable. Insert a MS21919-WCG11 cable clamp (11) around these cables. Attach clamp to side of fuselage on line with previously installed clamps.

Gather up free ends of left and right side launcher cables, AKI/Smoke Cable, and Sail Detector Cable. Insert a MS21919-WCG13 clamp (12) around all these cables. Attach clamp to side of fuselage on line with previously installed clamps.

Temporarily leave remaining lengths of cables on the ground.

Outside Cable Installation Task 6: Install Sail Detector Cable Assembly (Cont).



Remove access cover (13).

Gather up access cover and free ends of left and right side launcher cables, AKI/Smoke cable, and Sa Detector belt cable. Insert free ends of cables through hole in access cover. Move the access cover a past the access port (14) near the forward cross tube.

Route cable into the access port (14) through hole (15) into ammunition bay.

Attach cables inside the access port with a MS21919-WCG13 cable clamp (16).

Reinstall access cover (13) to fuselage using existing aircraft screws.

Outside Cable Installation Task 7: Install Left Side TOW Detector and Interface Cable Assembly.

Locate and uncoil cable assembly labeled LAUNCHER TOW DETECTOR-ACFT TOW INTFC.

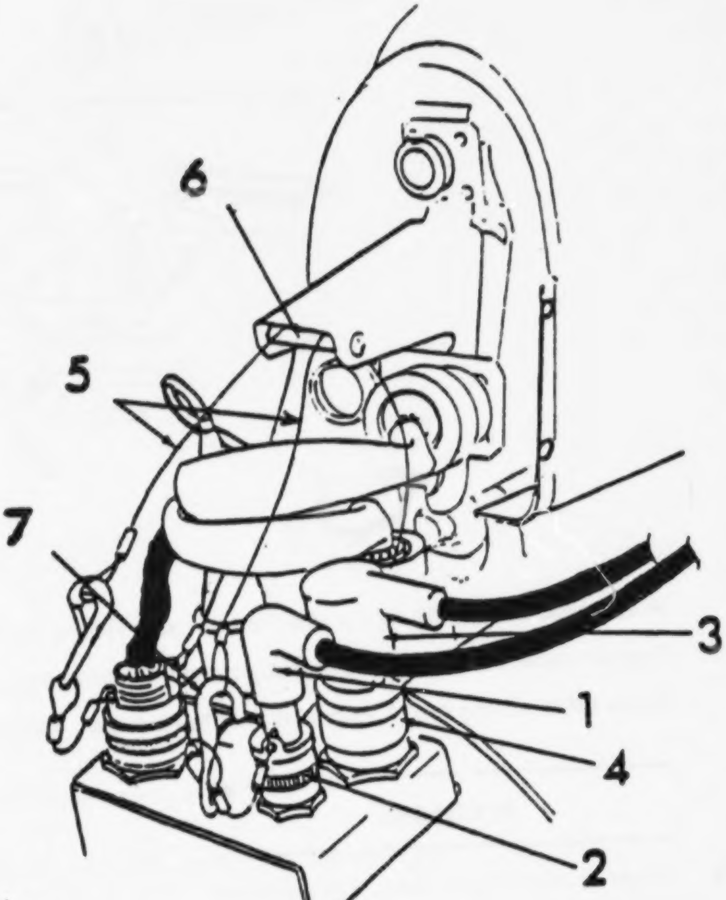
Connect cable connector P2 (1) to launcher pod connector J2 (2). Connect cable connector P4 (3) to launcher pod connector J4 (4).

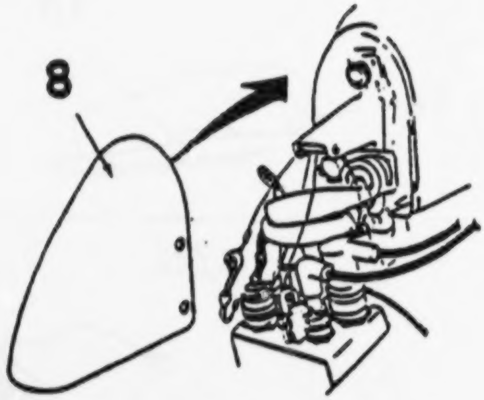
NOTE

If wing stub does not appear as shown, secure lanyards (5) in same manner as existing lanyards.

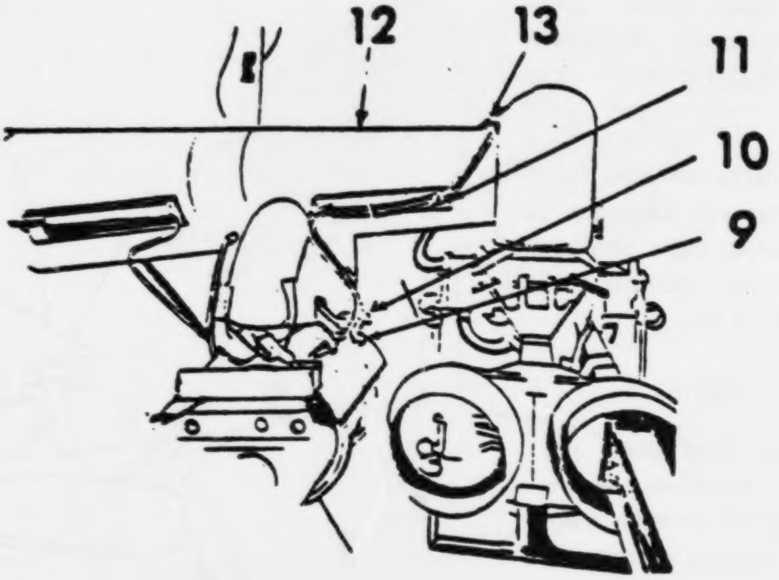
Install lanyards (5) through inboard wing stub station securing post (6) and attach to lanyard clip (7).

Reinstall aircraft pylon nose cone (8).





Outside Cable Installation Task 7: Install Left Side TOW Detector and Interface Cabl Assembly (Cont).



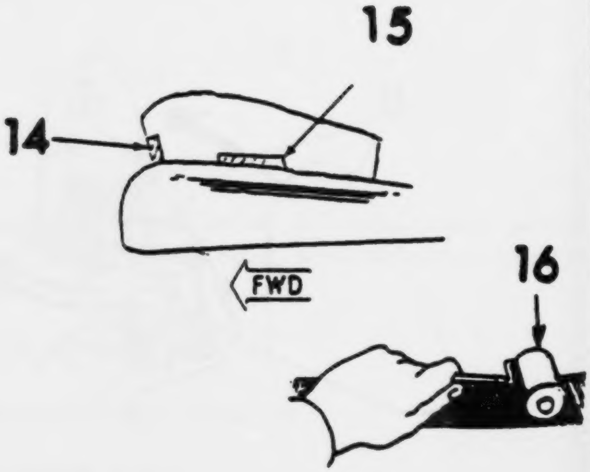
Wrap fastener strap (9) that is attached to cable around forward outboard sway brace (10).

Position cable pad (11) to cable along bottom leading edge of wing stub. Mark its location.

Route cable across top of wing stub (12) toward rear. Mark location of second fastener pad (13).

WARNING

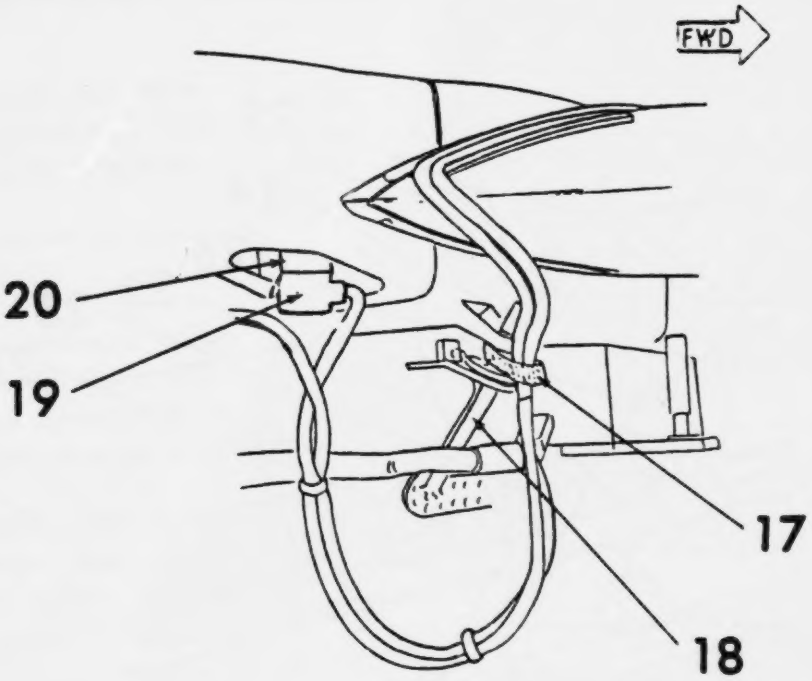
Primer is highly flammable. Do not spray near Heat, Sparks, or Open Flame. No Smoking. Use only in well-ventilated area.



Move cable out of way and coat previously marked areas with spray primer.

Cut two strips of fastener tape slightly longer than fastener pad. Attach tape strips (14, 15) to primed areas. Press hard with hand roller (16) (Item 7, Appendix C).

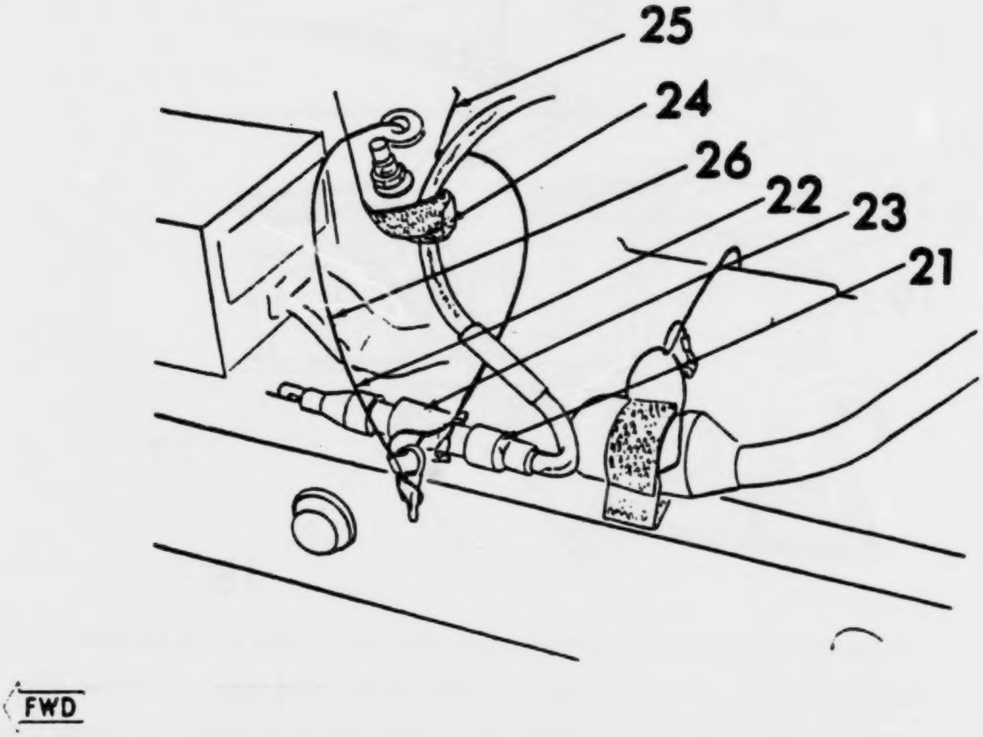
Press the two cable pads against fastener tape strips.



Wrap cable fastener strap (17) around aft inboard sway brace (18).

Connect cable connector P3 (19) to outboard wing stub connector 20P8J01 (20).

Outside Cable Installation Task 7: Install Left Side TOW Detector and Interface C Assembly (Cont).



Connect cable connector P1 (21) to TOW detector rack connector (22). Snap into clip (23) on to detector rack.

Wrap other cable fastener strap (24) around aft outboard sway brace (25).

Route P1 lanyard (26) through upper sway brace mounting hole and connect it to itself.

Outside Cable Installation Task 8: Install Right Side TOW Detector and Interface Cable Assembly.

Locate and uncoil cable assembly labeled LAUNCHER TOW DETECTOR – ACFT TOW INTFC.

Route P2 (1) and P4 (3) between J5 and locking nut.

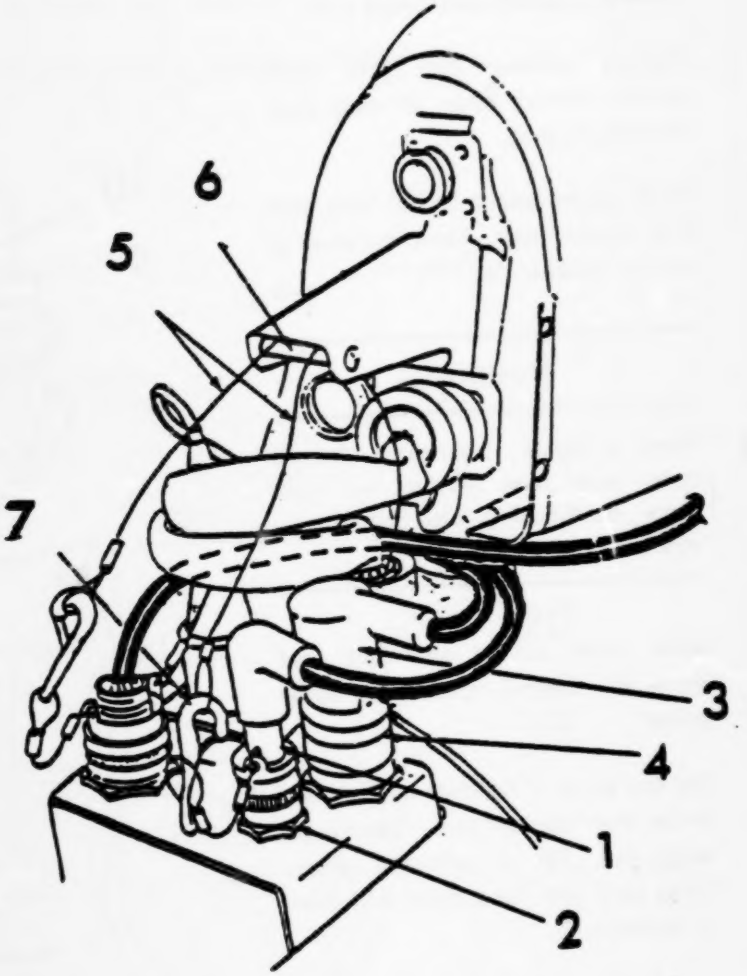
Connect cable connector P2 (1) to launcher pod connector J2 (2). Connect cable connector P4 (3) to launcher pod connector J4 (4).

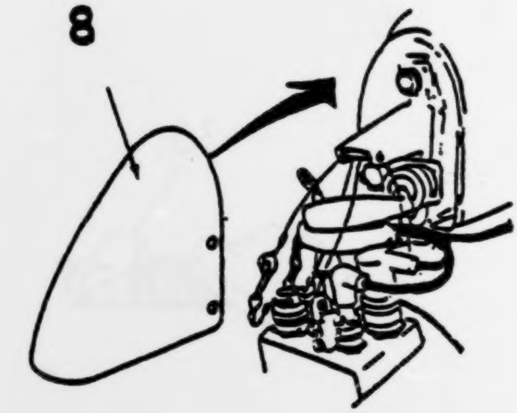
Install lanyards (5) through inboard wing stub station securing post (6) and attach to lanyard clip (7).

Reinstall aircraft pylon nose cone (8).

NOTE

If wing stub does not appear as shown, secure lanyards (5) in same manner as existing lanyards.



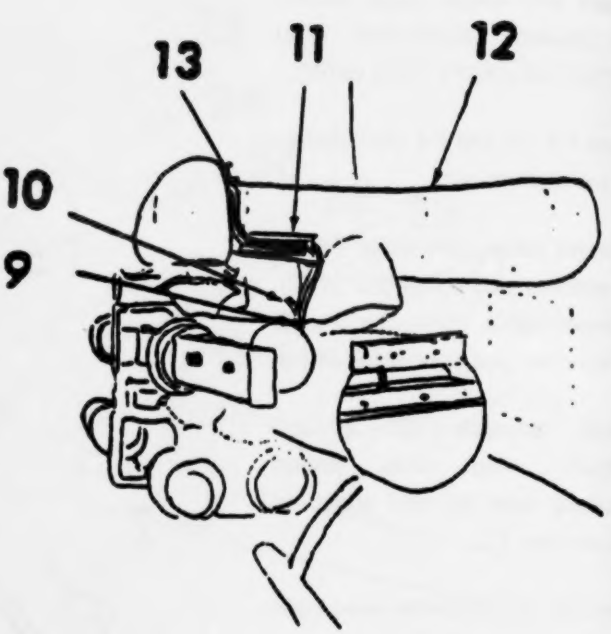


Outside Cable Installation Task 8: Install Right Side TOW Detector and Interface Cabl Assembly (Cont).

Wrap cable fastener strap (9) around forward outboard sway brace (10).

Position fastener pad (11) along bottom leading edge of wing stub. Mark its location.

Route cable across top of wing stub (12) toward rear. Mark location of second fastener pad (13).

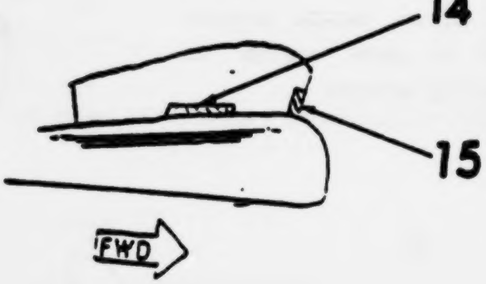


WARNING

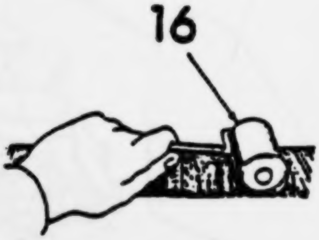
Primer is highly flammable. Do not spray near heat, sparks, or open flame. No Smoking. Use only in well-ventilated area.

Move cable out of way and coat previously marked areas with spray primer.

Cut two strips of fastener tape slightly longer than fastener pad. Attach tape strips (14, 15) to primered areas. Press hard with hand roller (16) (item 7, Appendix C).

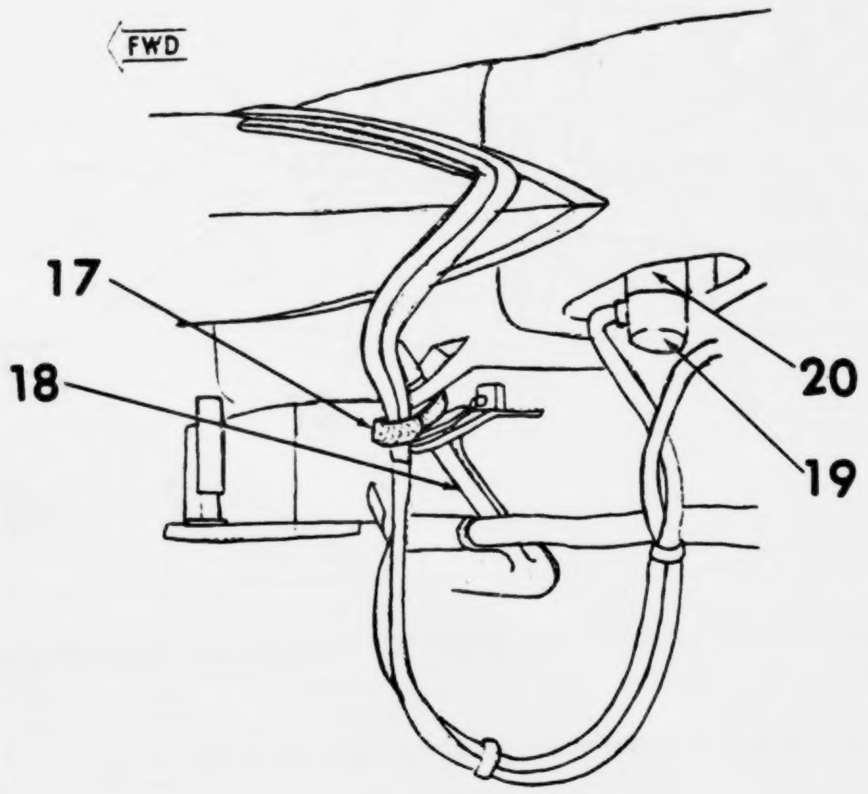


Press the two fastener pads against fastener tape strips.

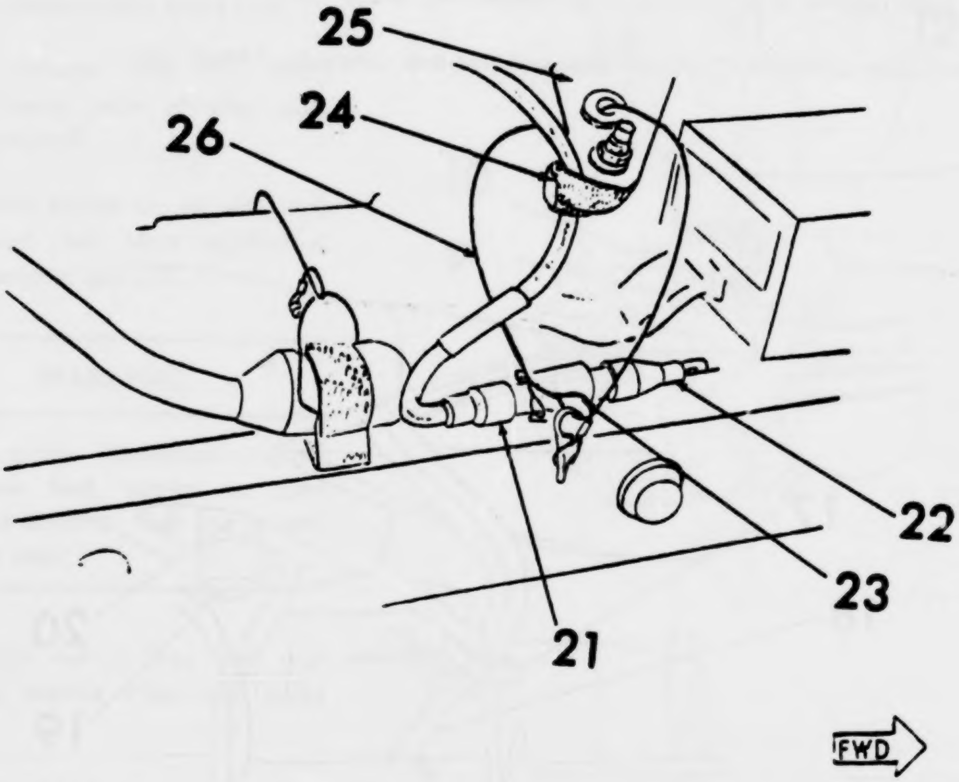


Wrap cable fastener strap (17) around aft inboard sway brace (18).

Connect cable connector P3 (19) to outboard wing stub connector 20P8J01 (20).



Outside Cable Installation Task 8: Install Right Side TOW Detector and Interface Cabl
Assembly (Cont).



Connect cable connector P1 (21) to TOW detector rack connector (22). Snap into clip (23) on top o
detector rack.

Wrap other cable fastener strap (24) around aft outboard sway brace (25).

Route P1 lanyard (26) through upper sway brace mounting hole and connect it to itself.

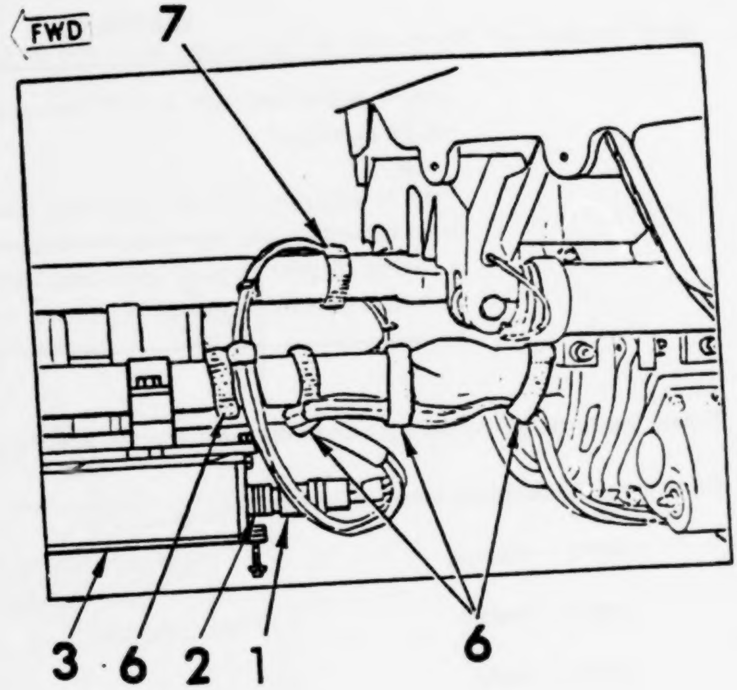
Outside Cable Installation Task 9: Install 20 mm Transmitter Cable Assembly.

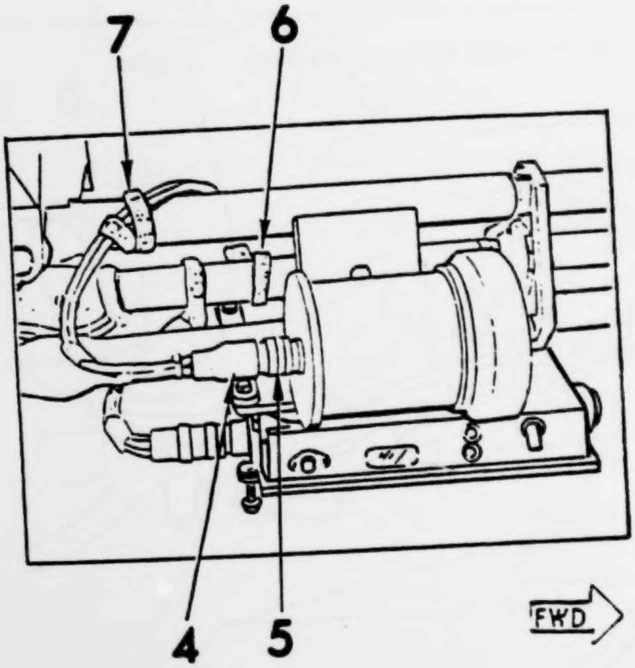
Locate and uncoil cable assembly labeled 20 MM CANNON - ALCA - INTFC - SAW - ACFT.

Connect cable connector P1 (1) to connector (2) on back of 20 mm transmitter (3).

Connect cable connector P3 (4) to FLASHWESS (5).

Secure cable with fastener straps around one of lower barrels (6) and another strap around upper barrel (7).





Outside Cable Installation Task 9: Install 20 mm Transmitter Cable Assembly (Cont).

WARNING

Ensure W3P8 (MOTOR) is NOT reconnected until end of MILES exercises.

Prior to applying POWER to system, clear Turret area of any obstruction and Warn personnel to stand clear. Erect a Safety Barrier around area that gun barrels sweep. Failure to comply may result in Injury to Personnel.

Rotate the turret 90° to the right and full up elevation to accomplish the following steps.

Disconnect the following cables from the 20 mm gun system:

W5P3 - Rounds

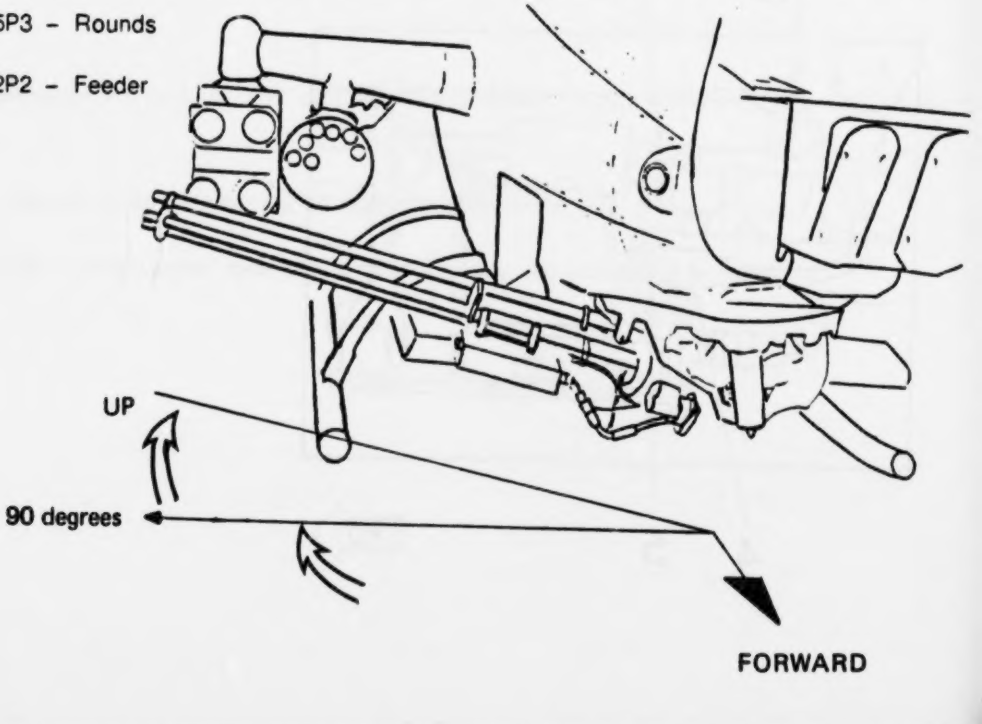
W2P2 - Feeder

W3P8 - Motor

Connect the following MILES cable plugs to 20 mm cables that were previously unplugged:

P4 to W5P3 - Rounds

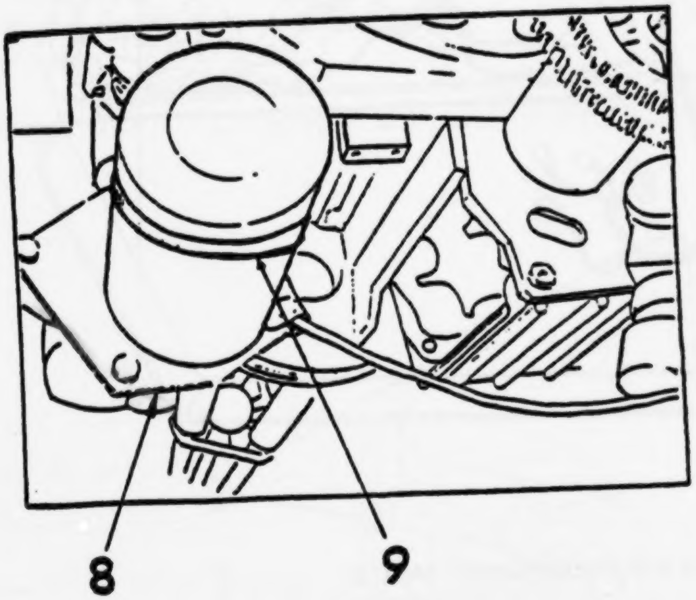
P5 to W2P2 - Feeder

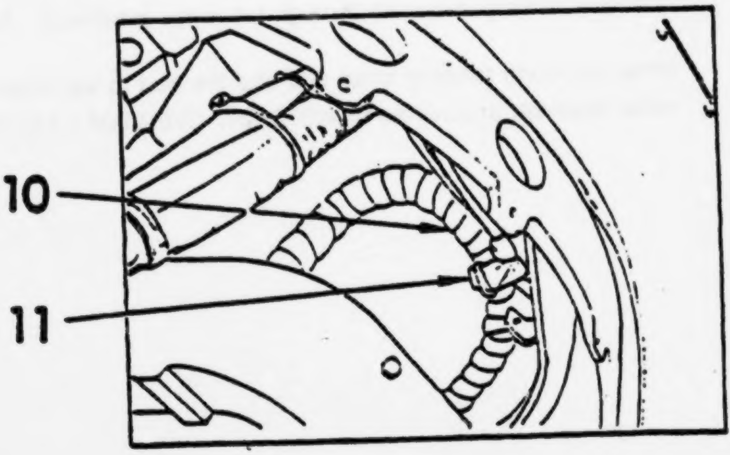


Secure cables to motor (8) using the extra long cable fastener strap (9).

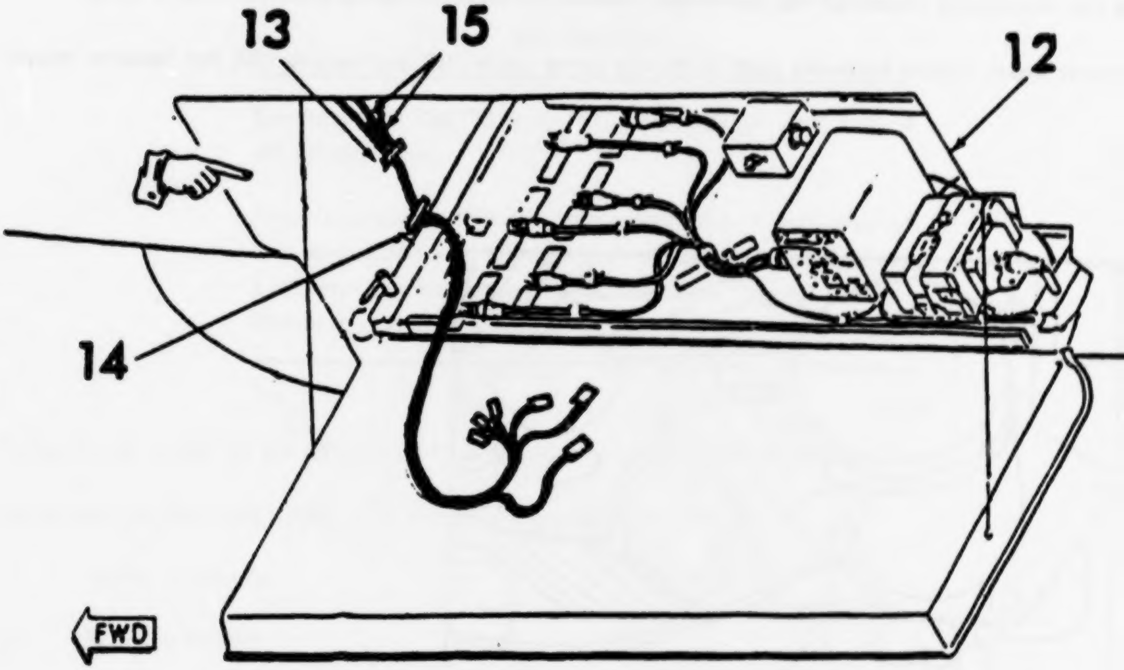
Secure the wire bundle to aircraft cables located behind 20 mm motor using another fastener strap.

Route cable inside gimble following path of 20 mm turret cable (10) and secure with two fastener straps (11).





Outside Cable Installation Task 9: Install 20 mm Transmitter Cable Assembly (Cont).



Route cable through ammunition way and into ammunition bay (12).

Manually rotate gun barrels through full range in azimuth. Ensure that cables do not bind.

Wrap the fourth fastener strap (13) and the next to last fastener strap (14) on the 20 mm transmit
cable assembly around the CONSTRAINT OVERRIDE – TSU and CKI – ALCA cables (15).

Outside Cable Installation Task 10: Install ALCA Interface Cable Assembly.

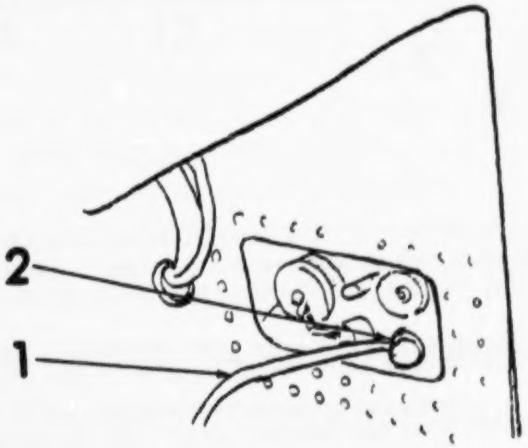
NOTE

Make sure all inside cabling tasks have been completed before beginning this task.

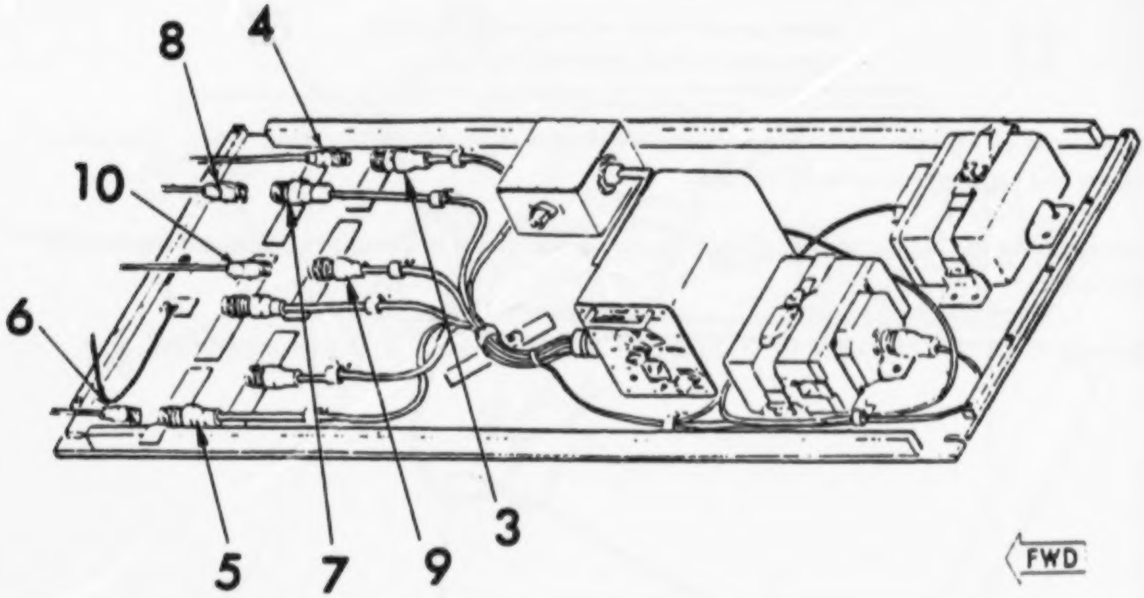
Check that all exterior cables are securely mounted and do not flap or hang loose. Reposition cables and cable clamps where necessary.

Cables on the ALCA Adapter Assembly are color coded to aid in installation. Connect like colored connectors.

Connect ALCA INTF connector P2 (1) to aircraft 20J237 connector (2) in ammunition bay.



Outside Cable Installation Task 10: Install ALCA Interface Cable Assembly (Cont).

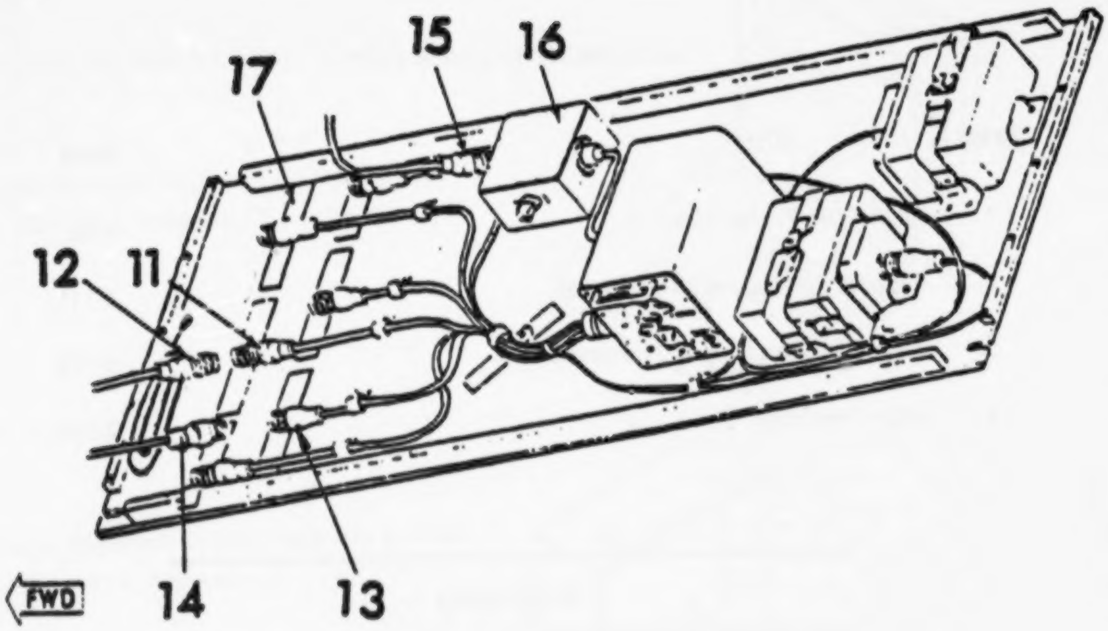


Connect P5 LAUNCHER ALCA INTFC (3) to one of Launcher-ALCA cables P1 (4) (there are two of these cables). [RED]

Connect P10 LAUNCHER ALCA INTFC (5) to other Launcher-ALCA cable P1 (6). [RED]

Connect P6 SAIL DETECTOR-ALCA INTFC (7) to Sail Detector cable P1 (8). [ORANGE]

Connect P7 CKI-ALCA INTFC (9) to CKI-ALCA cable P2 (10). [YELLOW]



Connect P8 20 mm CANNON-ALCA INTFC-SAW-ACFT (11) to 20 mm cable P2 (12). [GREEN]

Connect P9 AKI/Smoke ALCA INTFC (13) to AKI-Smoke cable P2 (14). [BLUE]

Connect P1 CONSTRAINT OVERRIDE – TSU Cable (15) to Constraints Override (16).

Wrap fastener strap on 20 mm cable around surrounding cables.

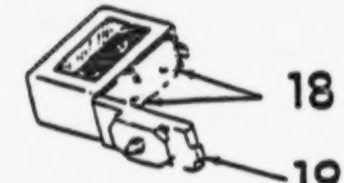
Secure mated cable pairs P5 through P10 to fastener straps (17) attached to ALCA mounting assembly.

Use remaining fastener strap to bundle up and secure all other excess cables in ammunition bay.

Install two 6 V batteries (18) in each battery box (19).

NOTE

Make sure the TSGMS circuit breaker located in battery compartment is ON.



(The information on pages 2-96 and 2-97 has been deleted.)

INITIAL ADJUSTMENTS, DAILY CHECKS AND SELF TEST

ALIGNMENT TASKS - LIST

Task	Title	Page
1.	Align TOW Transmitter	2-99
2.	Align 20 mm Cannon Transmitter	2-111
3.	Align 2.75-Inch Rocket Transmitter	2-114
4.	Align Detectors	2-116

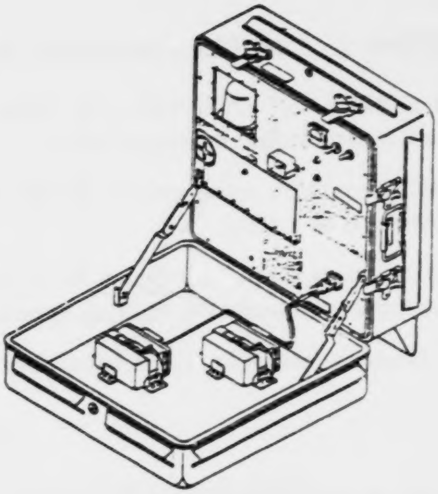
WARNING

If task requires Vehicle Power to be turned ON, ensure Vehicle Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

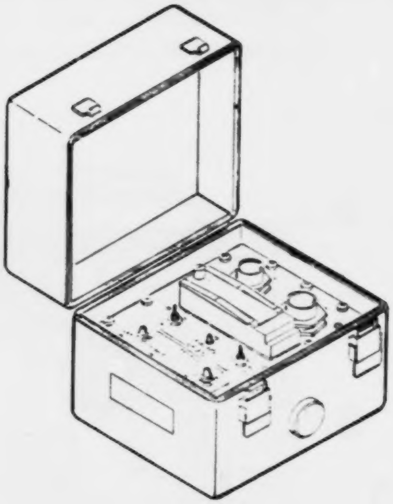
Alignment Task 1: Align TOW Transmitter.

The following alignment equipment is required:

Multiple-Range Alignment Device (MRAD)
(Section II, Appendix C)



Laser Alignment Control Assembly (LACA)
(Section II, Appendix C)



An Auxiliary Power Unit (APU) is also required. Attach and turn on APU using normal procedures.

CAUTION

TOW alignment must be performed with APU power only. Do not use internal power.

Alignment Task 1: Align TOW Transmitter (Cont).

Disconnect CONSTRAINT OVERRIDE–TSU cable, connector P2, from the TSU adapter cable locate beneath the Gunner's station instrument panel.

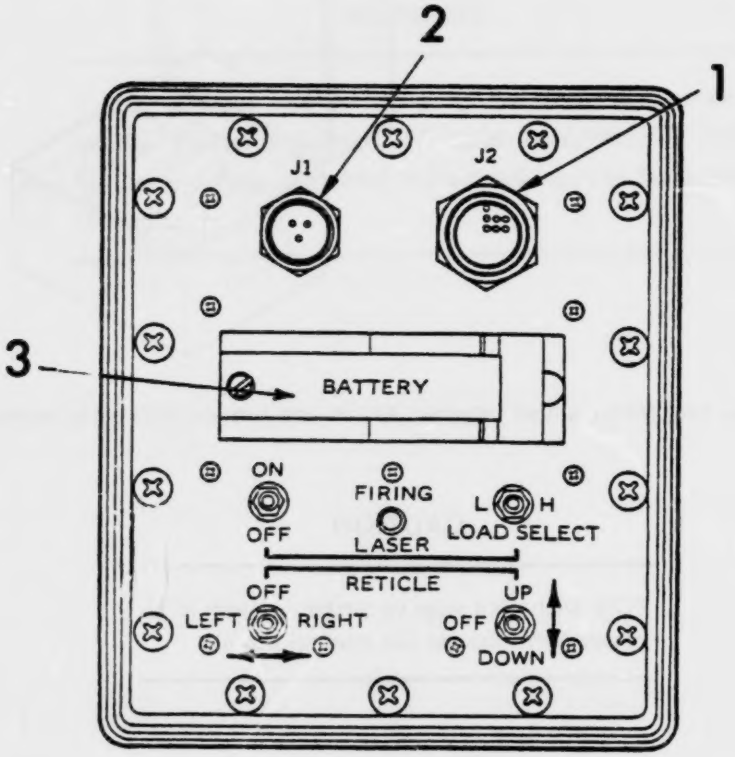
Connect LACA Test Cable, connector P1, to TSU adapter cable. Attach LACA Test Cable, connector P to J2 receptacle (1) on LACA.

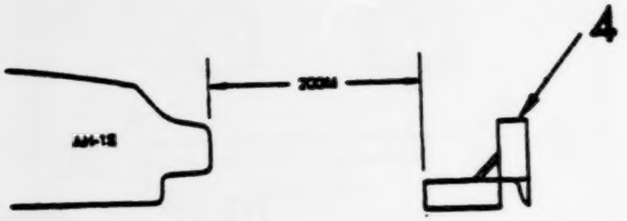
Connect LACA Power Cable, connector P2, to aircraft 20J237 receptacle in ammunition bay. Attac LACA Power Cable, connector P1, to J1 receptacle (2) on LACA.

Ensure 9 V battery is installed in LACA battery box (3).

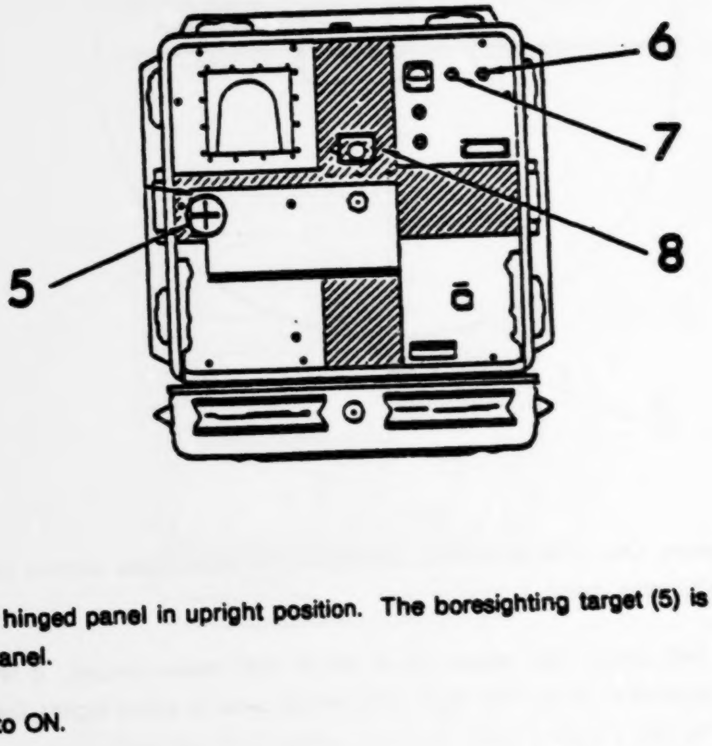
NOTE

Make sure aircraft power is ON. Ensure LACA LOAD SELECT switch is in same position as Constraint Override Assembly LOAD SELECT switch (L or H).


2
1
J1
J2
3
BATTERY
ON
OFF
FIRING
LASER
L
H
LOAD SELECT
RETICLE
OFF
LEFT
RIGHT
UP
OFF
DOWN



Place Multiple-Range Alignment Device (MRAD) (4) between 200 and 250 meters in front of helicopter.

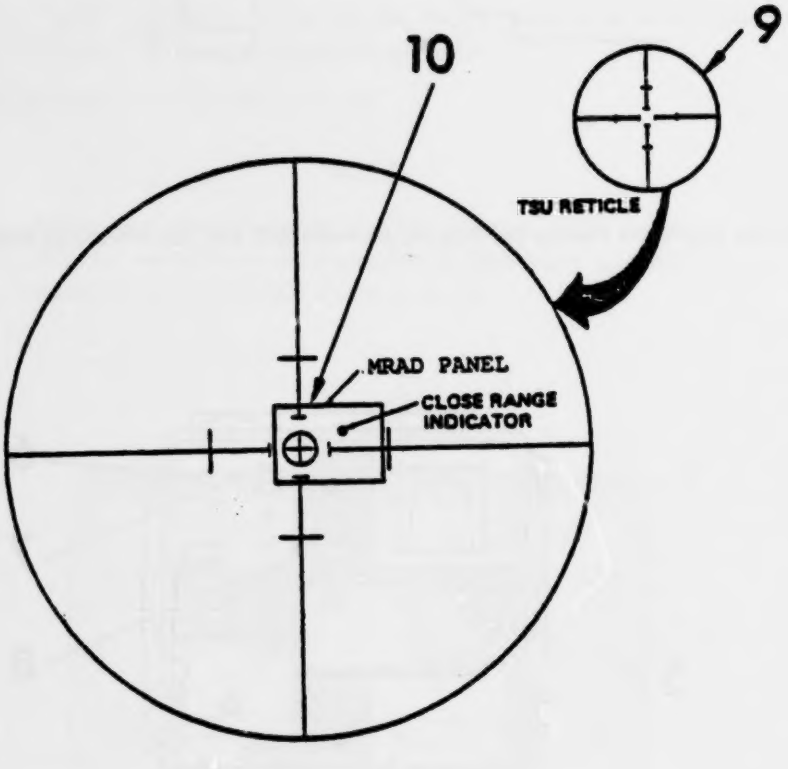


Open MRAD and place hinged panel in upright position. The boresighting target (5) is located on the left center of MRAD front panel.

Turn Power switch (6) to ON.

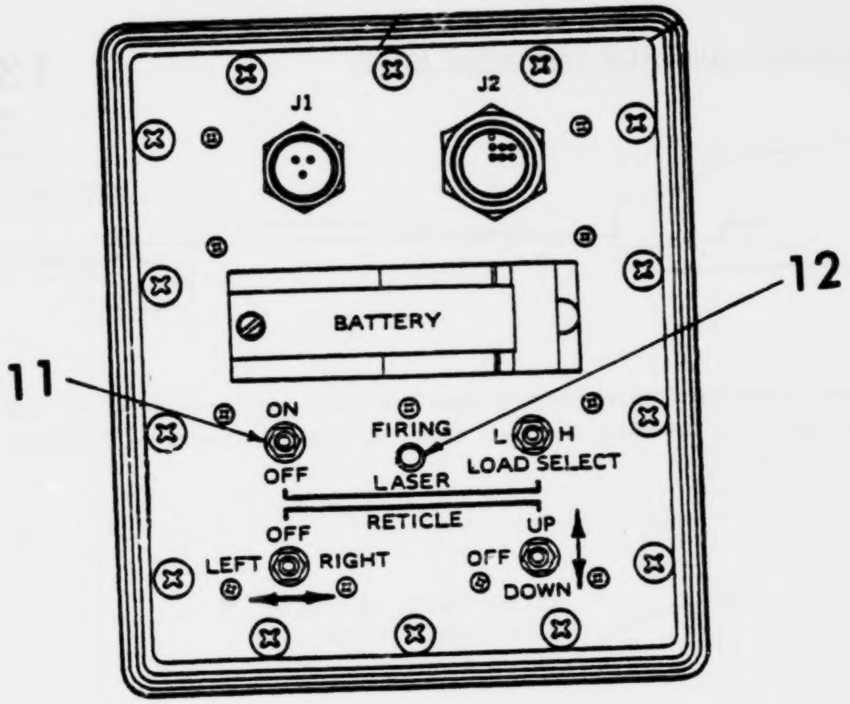
Turn Indicator Select switch (7) to CLOSE RANGE. Close Range Indicator (8) will light when laser beam is on target (9).

Alignment Task 1: Align TOW Transmitter (Cont).

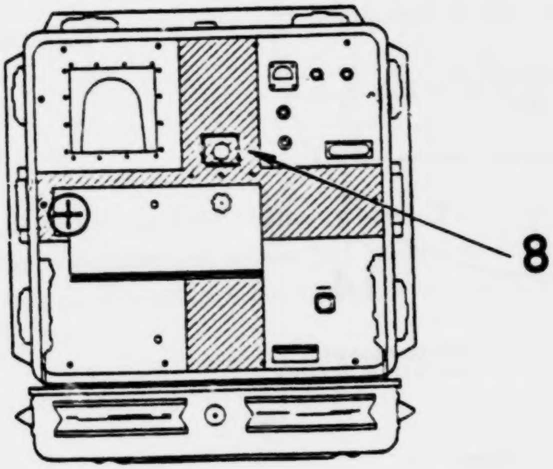

10
9
TSU RETICLE
MRAD PANEL
CLOSE RANGE INDICATOR

Turn TOW TSU system ON. Follow normal procedures in appropriate aircraft operator manual. Place optics in high magnification mode.

Sight through TSU and center TSU reticle (9) on MRAD 200 meters distant. If MRAD panel (10) cannot be seen, use TSU controls to move TSU sight until MRAD panel is within sight's field of view.

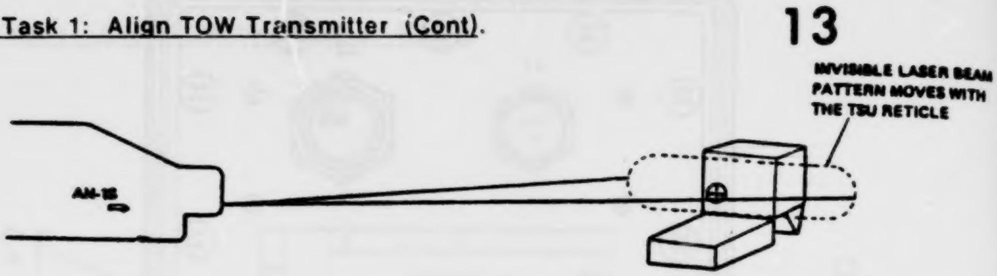

J1
J2
BATTERY
12
11
ON
OFF
FIRING
LASER
L
H
LOAD SELECT
RETICLE
OFF
LEFT
RIGHT
UP
OFF
DOWN

Turn LACA power switch (11) to ON. Laser firing LED (12) on LACA lights when TSU-mounted laser transmitter is ON.

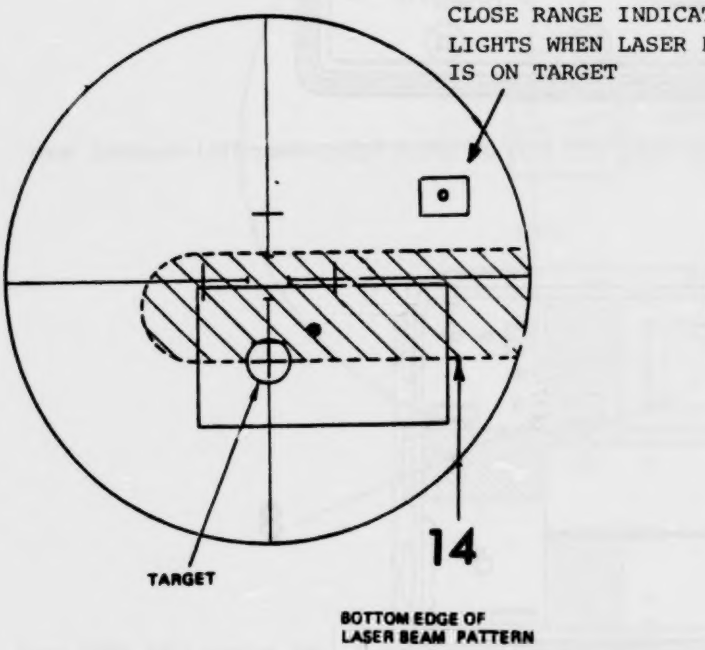


Using TSU track control stick, slew the TSU reticle until the Close Range Indicator (8) on the MRAD lights. This indicates the laser beam is on target.

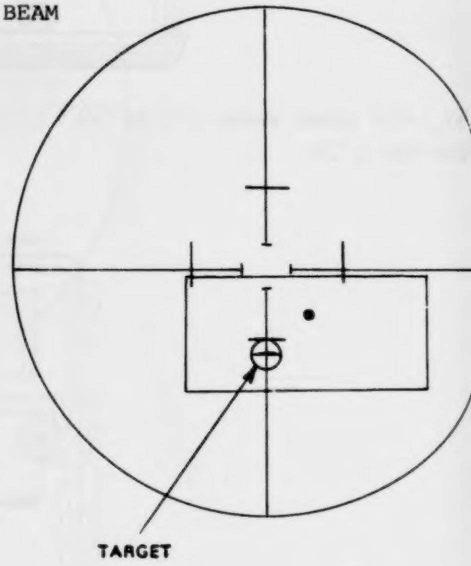
Alignment Task 1: Align TOW Transmitter (Cont).


13
INVISIBLE LASER BEAM PATTERN MOVES WITH THE TSU RETICLE
AH-1S

The TSU laser transmitter fires an invisible beam (13) of light which simulates the TOW weaponry on th AH-1S helicopter. The following steps will align this laser beam with the helicopter weapon sightin optics.

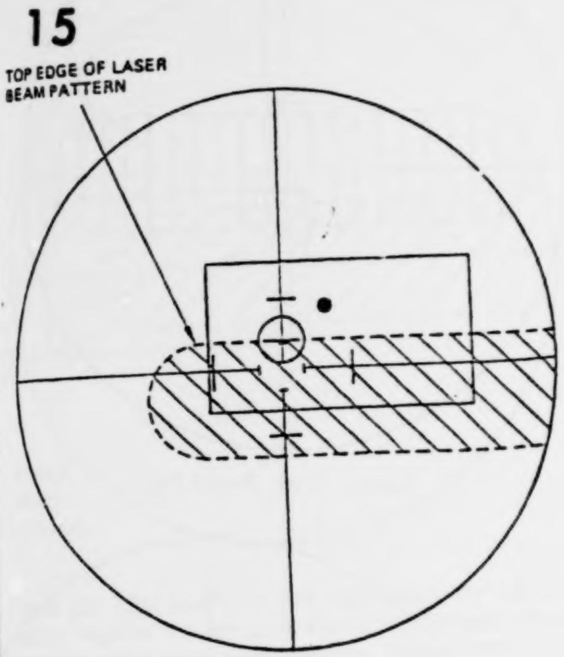

CLOSE RANGE INDICATOR LIGHTS WHEN LASER BEAM IS ON TARGET
TARGET
14
BOTTOM EDGE OF LASER BEAM PATTERN

Laser Beam Position

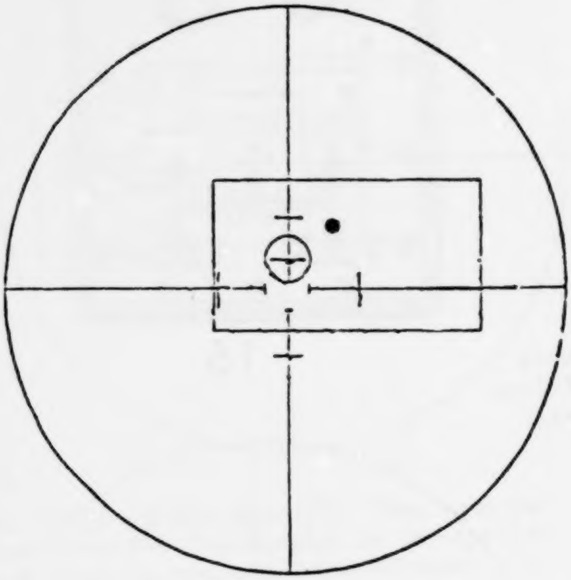


Actual Reticle View

Move TSU reticle upward until MRAD Close Range Indicator goes OFF. Then carefully move TSU retic downward until MRAD Close Range Indicator just comes ON. This identifies the bottom edge (14) of t invisible laser beam pattern. Note position of horizontal reticle line relative to MRAD target.



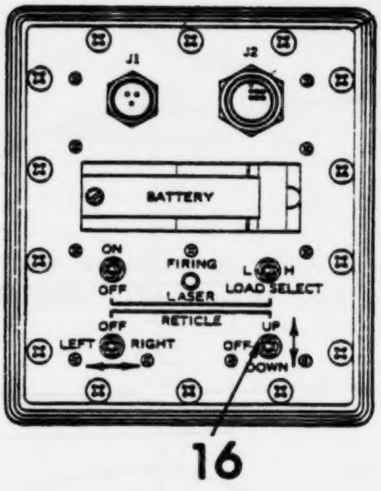
Laser Beam Position

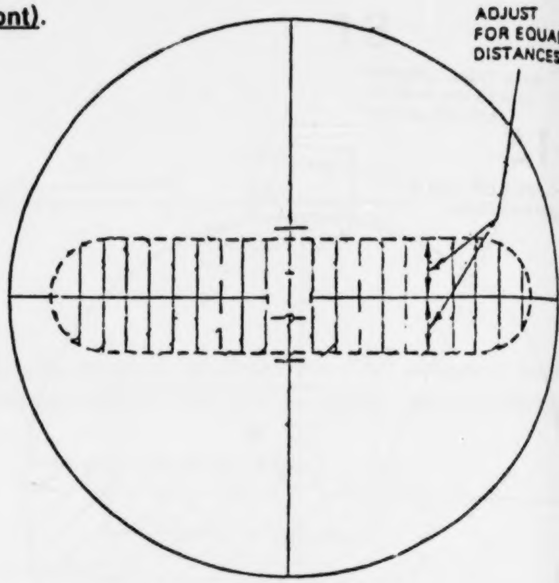


Actual Reticle View

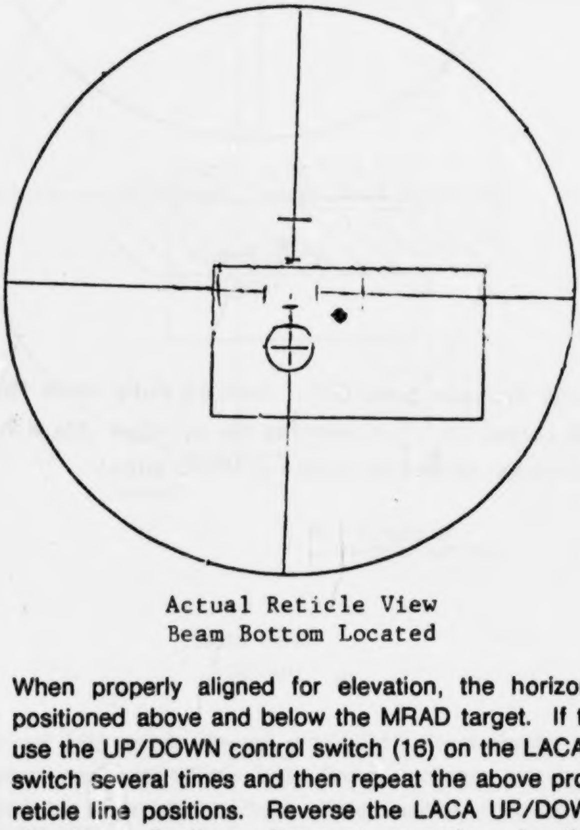
Move TSU reticle downward until MRAD Close Range Indicator goes OFF. Then carefully move TSU reticle upward until MRAD Close Range Indicator just comes ON. This identifies the top edge (15) of the invisible laser beam pattern. Note new position of horizontal reticle line relative to MRAD target.

Alignment Task 1: Align TOW Transmitter (Cont).

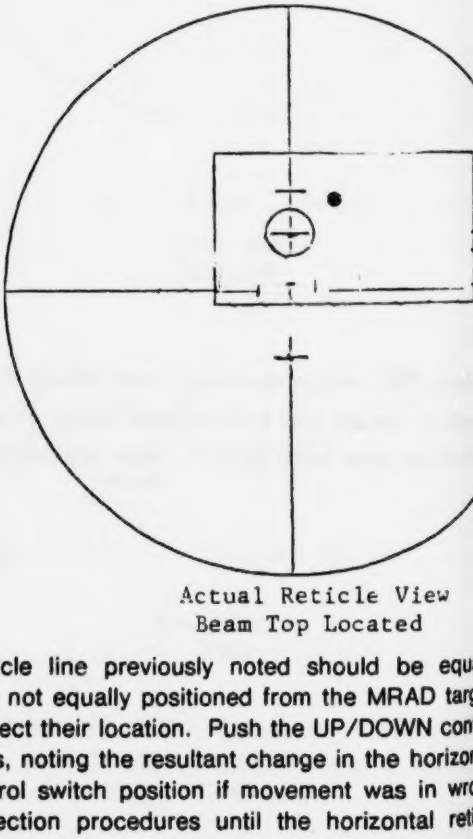

J1
J2
BATTERY
ON
OFF
FIRING
LASER
L
H
LOAD SELECT
RETICLE
OFF
LEFT
RIGHT
UP
OFF
DOWN
16


ADJUST
FOR EQUA
DISTANCES

Laser Beam Position



Actual Reticle View
Beam Bottom Located

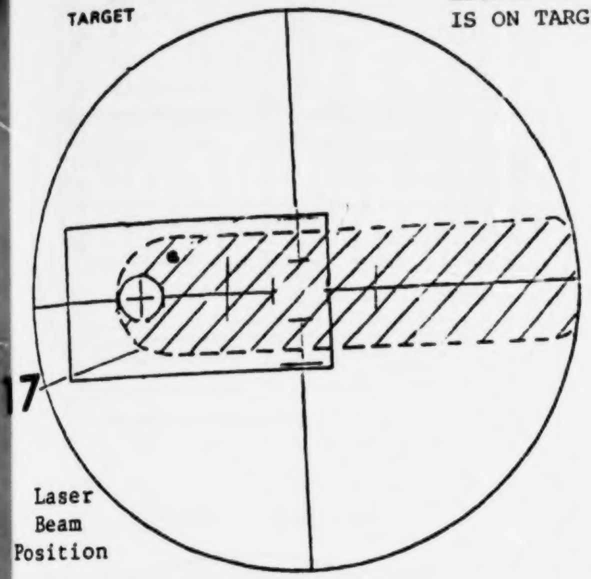


Actual Reticle View
Beam Top Located

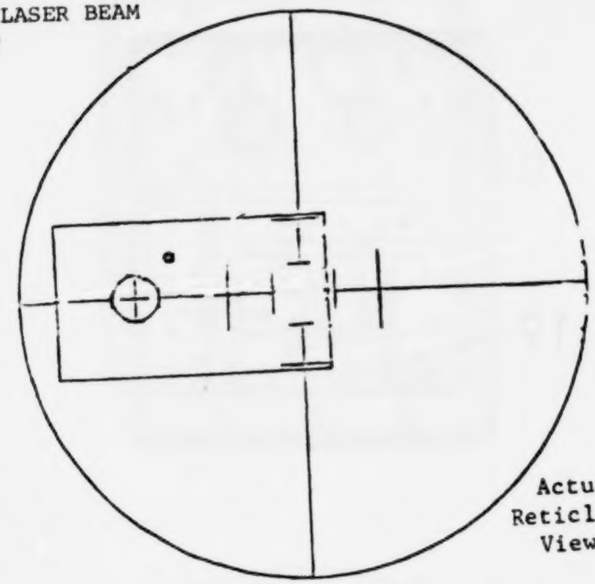
When properly aligned for elevation, the horizontal reticle line previously noted should be equ positioned above and below the MRAD target. If they are not equally positioned from the MRAD targ use the UP/DOWN control switch (16) on the LACA to correct their location. Push the UP/DOWN con switch several times and then repeat the above procedures, noting the resultant change in the horizo reticle line positions. Reverse the LACA UP/DOWN control switch position if movement was in wro direction. Continue alignment, repeating elevation correction procedures until the horizontal reti locating the top and bottom of the beam are equally positioned above and below the MRAD target.

The TOW transmitter azimuth alignment is similar to procedures used for the elevation alignment.

CLOSE RANGE INDICATOR
LIGHTS WHEN LASER BEAM
IS ON TARGET

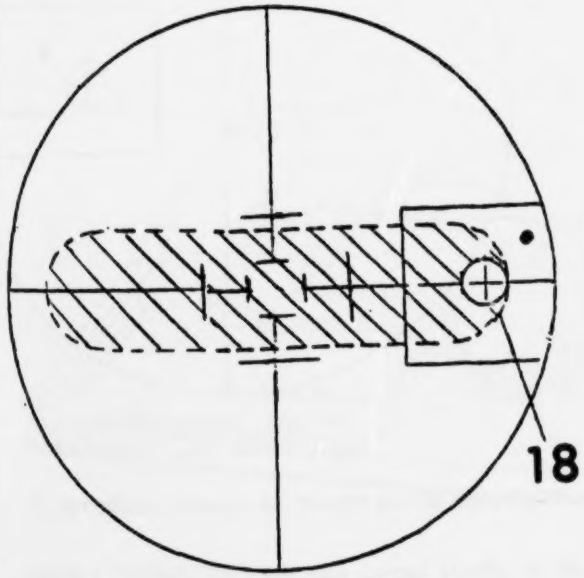


Laser
Beam
Position

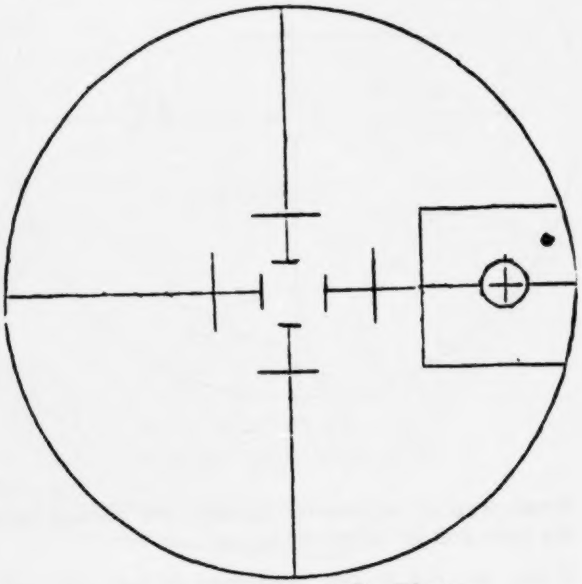


Actual
Reticle
View

Move the TSU reticle to the right until the MRAD Close Range Indicator goes OFF. Then move the reticle back to the left until the Close Range Indicator just comes ON. This identifies the left edge (17) of the invisible laser beam pattern. Note position of vertical reticle line relative to the MRAD target.



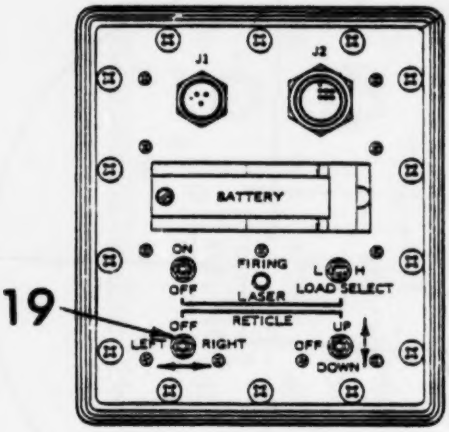
Laser Beam Position

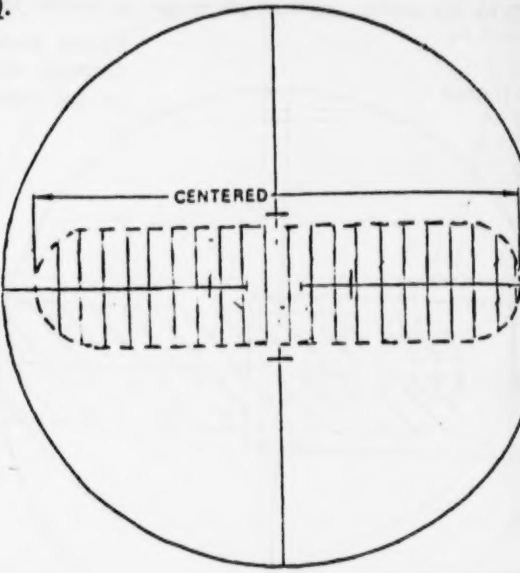


Actual Reticle View

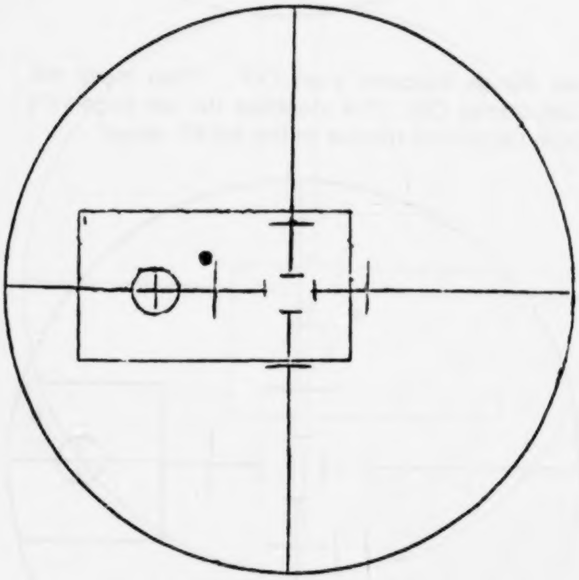
Move TSU reticle to the left until MRAD Close Range Indicator goes OFF. Move reticle back to the right until Close Range Indicator just comes ON. This identifies the right edge (18) of the invisible laser beam pattern. Note position of vertical reticle line relative to the MRAD target.

Alignment Task 1: Align TOW Transmitter (Cont).

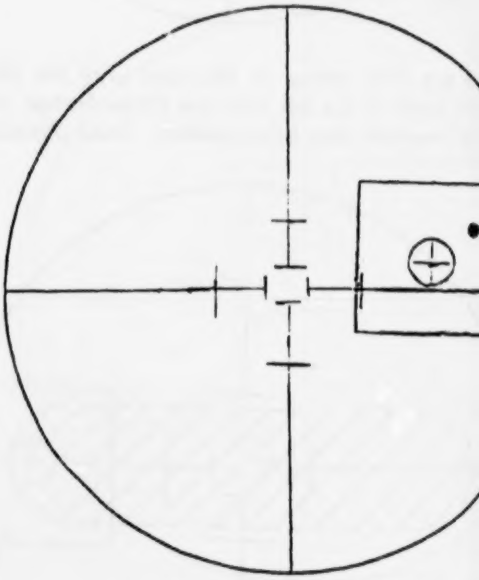




Laser Beam Aligned



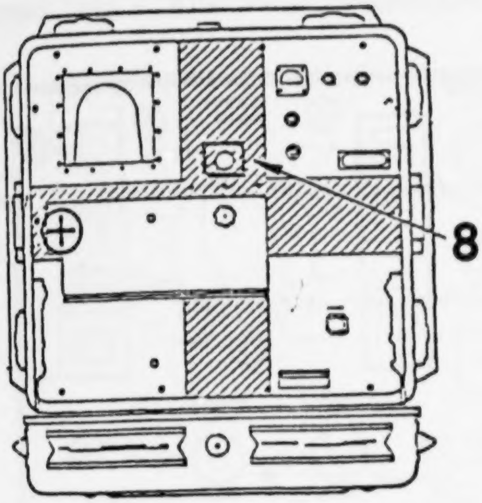
Actual Reticle View
Left Beam Edge Located

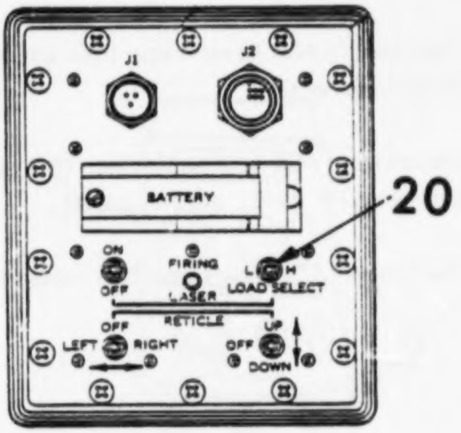


Actual Reticle View
Right Beam Edge Located

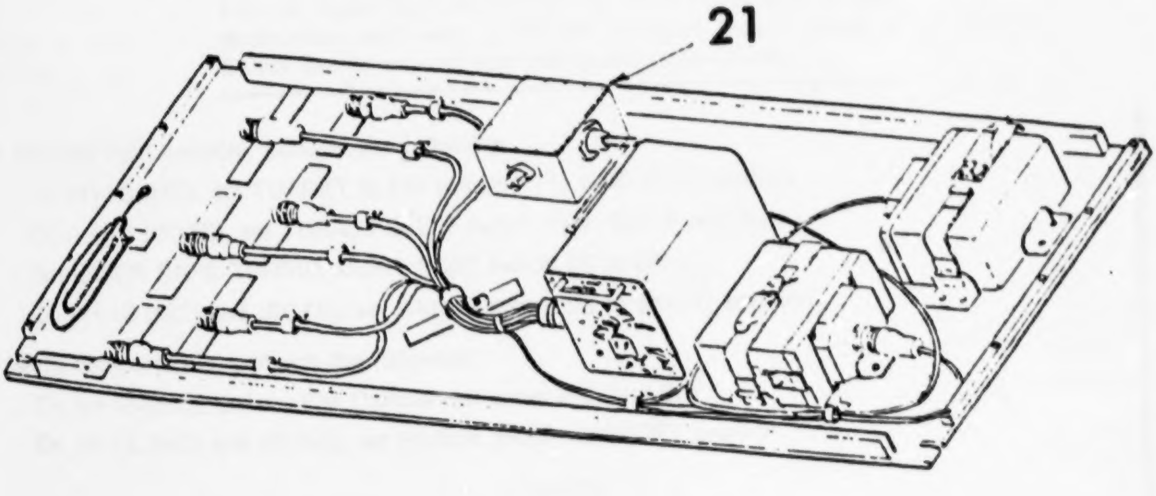
When properly aligned for azimuth, the vertical reticle line noted above should be equally positioned t the right and left of MRAD target.

If they are not equally positioned to the right and left of MRAD target, use the LEFT/RIGHT contr switch (19) on the LACA to correct their location. Push the LEFT/RIGHT control switch several time and then repeat previous procedures, noting change in the vertical reticle line positions. Reverse LAC LEFT/RIGHT control switch movement if change was in wrong direction. Continue repeating azimut alignment procedures until vertical reticle locating the right and left limits of beam are equall positioned to the right and left of MRAD target.




J1
J2
BATTERY
ON
OFF
FIRING
LASER
L H
LOAD SELECT
RETICLE
OFF
LEFT
RIGHT
OFF
UP
DOWN
20

After elevation and azimuth alignment has been completed, aim TSU at MRAD so that Close Range Indicator (8) lights. Change LOAD SELECT switch (20) on LACA. If switch was at L, turn to H. If switch was at H, turn to L. Have a Controller reset Constraint Override Assembly (21) to match LACA. Verify that Close Range Indicator lights when TSU reticle is on target.



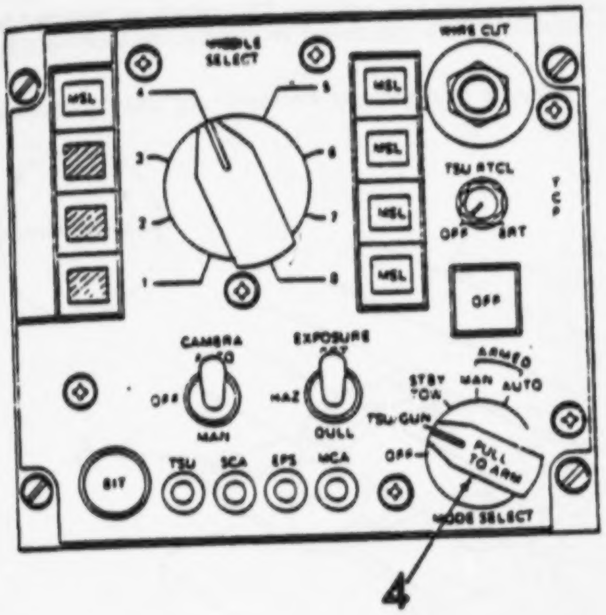
Alignment Task 1: Align TOW Transmitter (Cont).

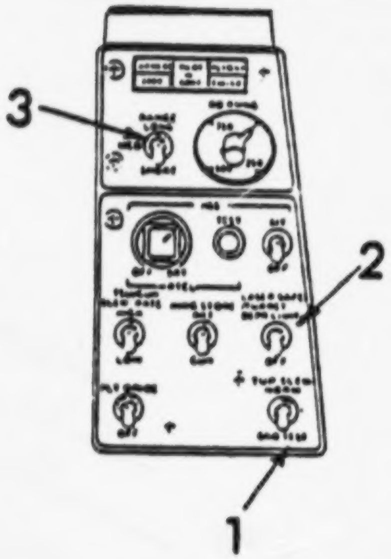
Disconnect LACA Power cable from aircraft 20J237 connector. Reconnect ALCA INTFC connector P2 to 20J237 connector.

Disconnect LACA Test cable from TSU adapter cable. Reconnect CONSTRAINT OVERRIDE-TSU cable, connector P2, to TSU adapter cable.

Disconnect LACA Power and Test cables from LACA and store in LACA case assembly.

gnment Task 2: Align 20 mm Cannon Laser Transmitter.


MISSILE SELECT
WIRE CUT
MSL
MSL
MSL
MSL
MSL
1
2
3
4
5
6
7
8
TSU RTCL
OFF
BRT
TCP
OFF
CAMERA
AUTO
OFF
MAN
EXPOSURE
HAZ
DULL
ARMED
STBY TOW
MAN
AUTO
TSU/GUN
OFF
PULL TO ARM
MODE SELECT
BIT
TSU
SCA
EPS
MCA
4


3
RANGE
SHORT
TEST
BIT
OFF
2
GND TEST
1

WARNING

Prior to applying Power to system, clear turret area of any obstruction and warn personnel to stand clear. Erect a Safety Barrier around area that gun barrels sweep.

On gunners right console, perform the following:

On AH-1S (MC), set TURRET SLEW switch (1) to GND TEST position.

On AH-1S (ECAS), set TURRET SLEW switch (1) to SLOW position.

Set LASER SAFE/TURRET DEPR. LIMIT switch (2) to ON.

On AH-1S (MC) and (ECAS), set RANGE switch (3) to SHORT position.

In pilot's compartment, perform the following:

On AH-1S (MC), ensure Fire Control Computer (FCC) is OFF.

On AH-1S (MC) and (ECAS), set RANGE switch to SHORT position.

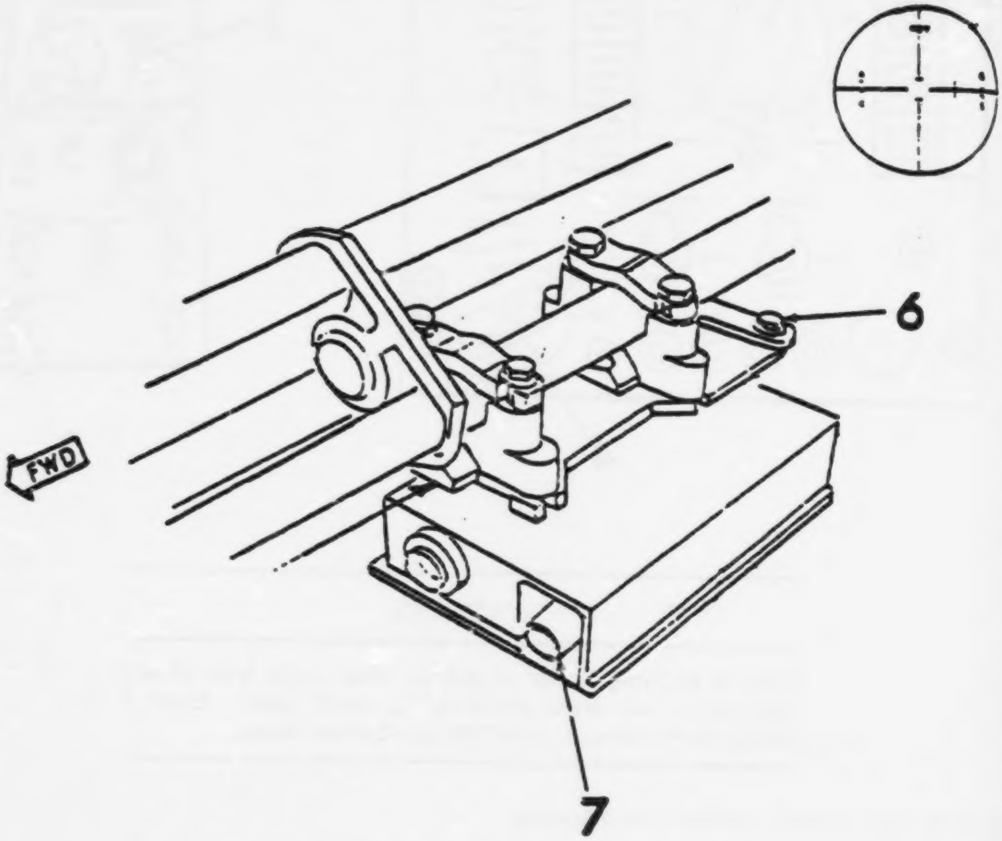
NOTE

After approximately 8 seconds, TCP will go into BIT mode, proceed upon completion of BIT.

Set TOW Control Panel (TCP) MODE SELECT switch (4) to TSU/GUN position.

Alignment Task 2: Align 20 mm Cannon Transmitter (Cont).

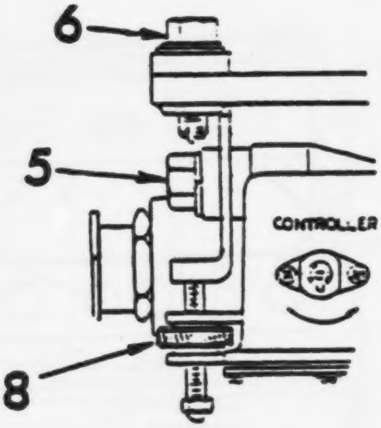
Select convenient target not less than 1500 meters. Position and maintain TSU reticle on selected targe TSU must be in HI MAG position.



Loosen two bolts (5) on rear and two bolts (6) on top of 20 mm transmitter. Position transmitte borescope (7) reticle on boresight target using elevation adjustment knobs (8) while manually movin transmitter in azimuth.

eat alignment procedures as necessary until transmitter reticle and TSU recticle are aligned.

nten bolts (5) and (6). Recheck boresighting accuracy.



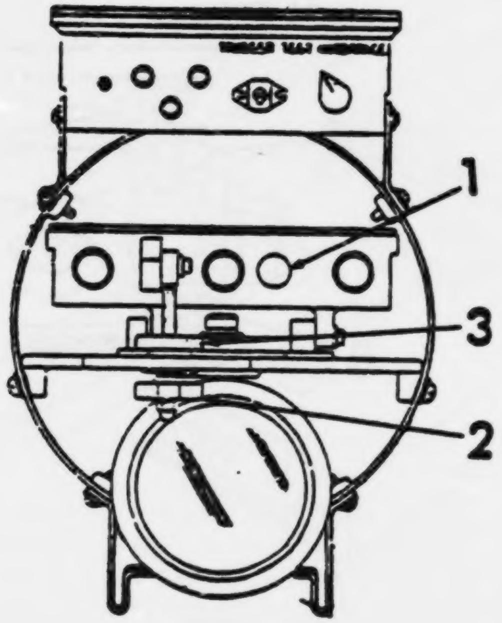
NOTE

RANGE switch must remain in SHORT position during MILES exercises.

Alignment Task 3: Align 2.75-Inch Rocket Transmitter.

Position aircraft head up display (HUD) stadiametric reticle or reflex sight on a convenient target a distance of not less than 1500 meters for azimuth and elevation adjustment.

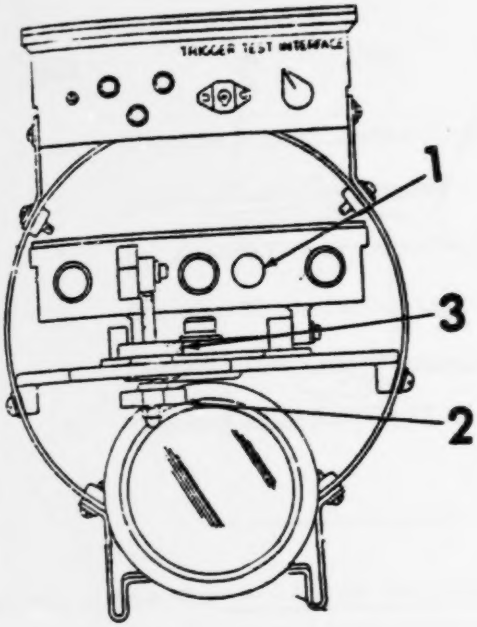
Place standard 20 mm boresight scope (Part of Item 1, Section II, Appendix C) with barrel adapter (Part Item 1, Section II, Appendix C) into boresight hole (1) in launcher transmitter.

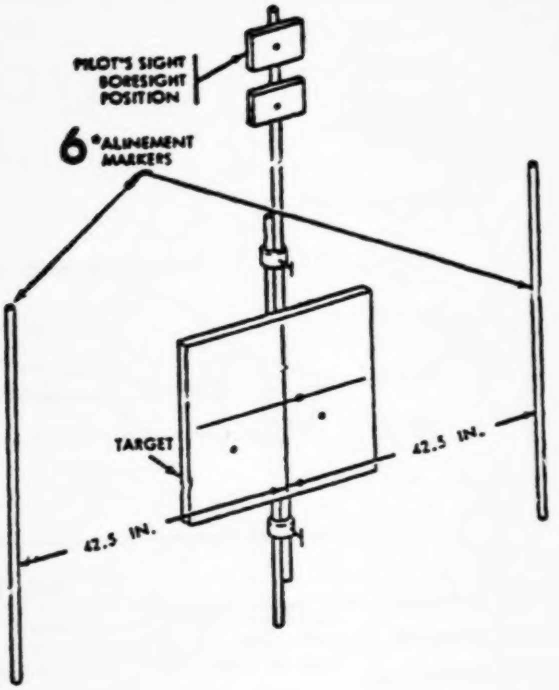


Release transmitter adjustment locking knob (2). Adjust transmitter elevation by turning elevatio adjustment knob (3). Adjust azimuth by moving transmitter. Align reticle of boresight scope to sam target as HUD stadiametric reticle. Tighten locking knob and recheck alignment. Repeat procedure necessary.

NOTE

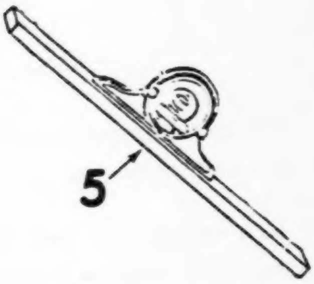
The 2.75-inch launcher system must be non-operational during boresighting procedures.


TRIGGER TEST INTERFACE
1
3
2

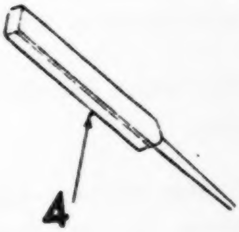

PILOT'S SIGHT BORESIGHT POSITION
6 *ALINEMENT MARKERS
TARGET
42.5 IN.
42.5 IN.

An alternate method may be used to align the 2.75-inch rocket transmitter.

Place 20 mm barrel adapter into boresight hole (1) in rocket transmitter. Insert MILES Rocket Alignment Paddle (4) into adapter.



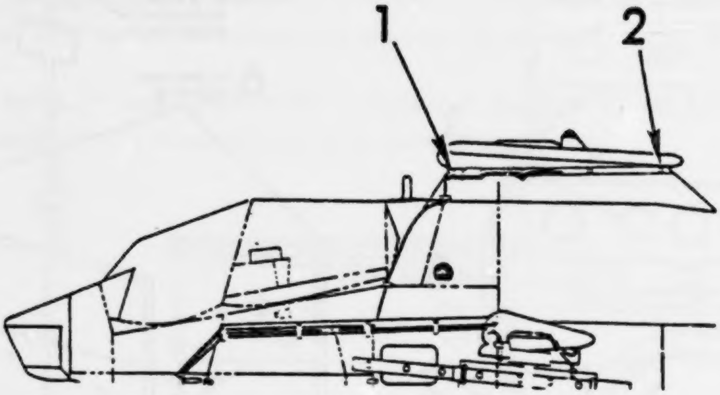
Obtain fore-aft attitude of aircraft using boresighting protractor (5) and procedures of TM 9-1090-206-12. Set protractor on top of MILES paddle. Release transmitter adjustment locking knob (2). Adjust rocket transmitter elevation with adjustment knob (3) until bubble in protractor vial is centered.



Use a boresight target and procedures of TM 9-1090-206-12 to adjust azimuth. Insert boresight scope into barrel adapter in boresight hole (1). Move transmitter until vertical crosshair of boresight scope is on 42.5-inch marker (6).

Repeat procedure for remaining transmitter.

Alignment Task 4: Align Detectors.



Sail belt detectors have been previously aligned. Check that all are aligned with white dots so that the forward detectors on both sides of helicopter sail (1) are pointing toward front and aft detectors (2) are pointing toward rear.

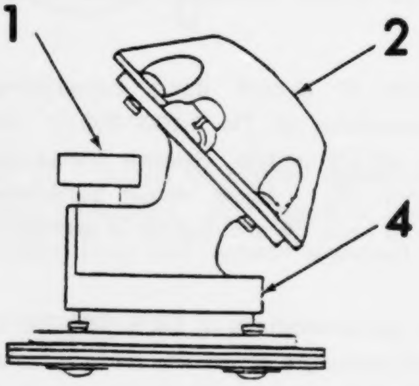
Pull up the spring plunger (1) and hold it in up position.

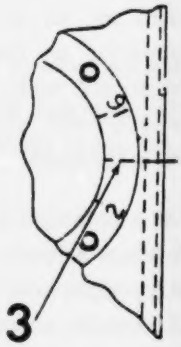
Turn detector (2) until detector index line (3) on detector body is pointing to white dot (4) on its base.

Align index line (3) on the detector body.

Release plunger. Make sure plunger returns to its down and locked position.

Repeat procedure for all adjustable detectors.



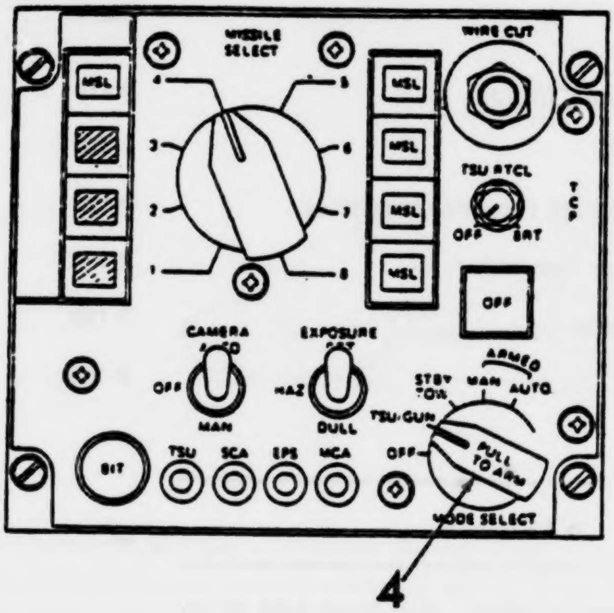


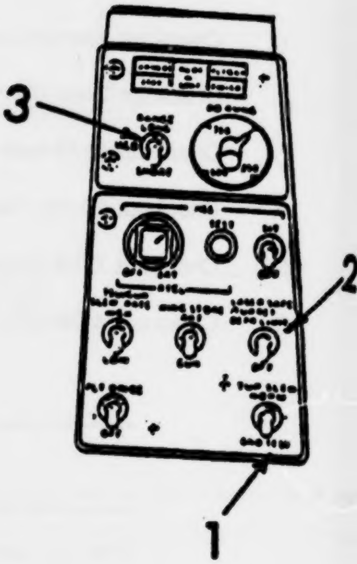
SYSTEM CHECKOUT TASKS - LIST

Task	Title	Page
1.	Checkout Aircraft Loaders Control (ALCA)	2-119
2.	Checkout Detection Systems	2-120
3.	Checkout (2.75-Inch Rocket) MILES Launcher Assemblies	2-122
4.	Checkout 20 mm Cannon Laser Transmitter	2-124
5.	Checkout TOW Laser Transmitter	2-128
6.	Checkout ATWESS	2-130

WARNING

Prior to applying Power to system, clear turret area of any obstruction and warn personnel to stand clear. Erect a Safety Barrier around area that gun barrels sweep.


MISSILE SELECT
WIRE CUT
MSL
MSL
MSL
MSL
MSL
1
2
3
4
5
6
7
8
TSU RTCL
OFF
BRT
TCP
OFF
CAMERA
AUTO
OFF
MAN
EXPOSURE
FAST
HAZ
DULL
ARMED
STBY TOW
MAN
AUTO
TSU-GUN
OFF
PULL TO ARM
MODE SELECT
BIT
TSU
SCA
EPS
MCA
4



On gunners right console, perform the following:

On AH-1S (MC), set TURRET SLEW switch (1) to GND TEST position.

On AH-1S (ECAS), set TURRET SLEW switch (1) to SLOW position.

Set LASER SAFE/TURRET DEPR. LIMIT switch (2) to ON.

On AH-1S (MC) and (ECAS), set RANGE switch (3) to SHORT position.

In pilot's compartment, perform the following:

On AH-1S (MC), ensure Fire Control Computer (FCC) is OFF.

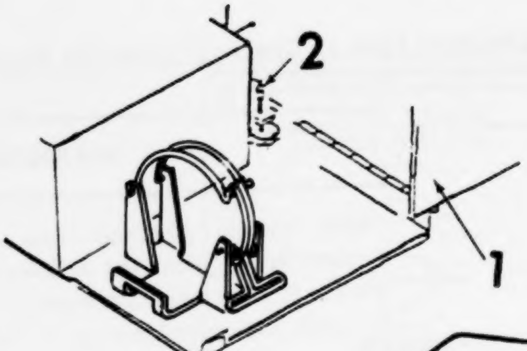
On AH-1S (MC) and (ECAS), set RANGE switch to SHORT position.

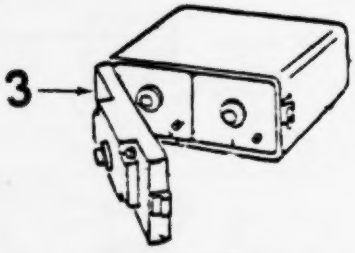
Set TOW Control Panel (TCP) MODE SELECT switch (4) to TSU/GUN position.

System Checkout Task 1: Checkout ALCA.

WARNING

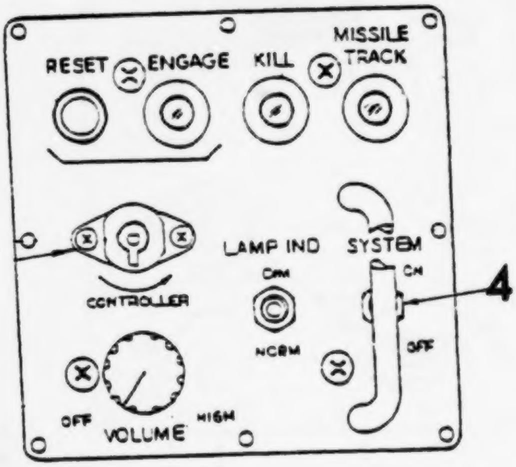
During System Checkout Task 1, ensure M18 Smoke Canister is NOT installed in Smoke Indicator. Ensure that the quick release pin is removed from the extractor. Failure to comply may result in Injury to Personnel.





Open up Smoke Indicator housing cover (1) and pull extractor shaft (2) out to its extended position.

Make sure two 6 V batteries have been installed in battery boxes (3) and that aircraft power 28 V dc or APU is ON.


RESET
ENGAGE
KILL
MISSILE TRACK
CONTROLLER
LAMP IND
DIM
NORM
SYSTEM
ON
OFF
4
OFF
VOLUME
HIGH

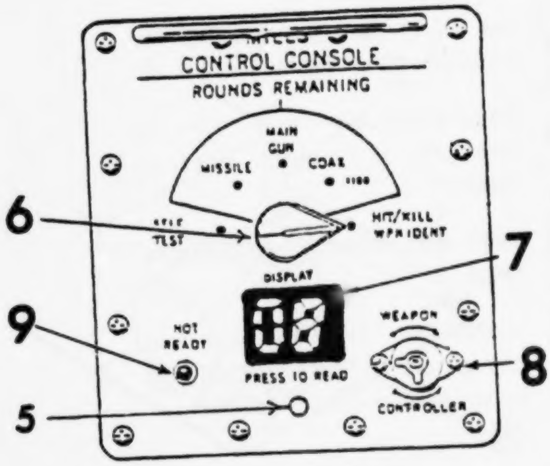
Momentarily turn system switch (4) on CKI to OFF then ON.

NOTE

If indication is not correct, turn to Troubleshooting, page 3-1.

Turn ROUNDS REMAINING switch (6) to HIT/KILL WPN IDENT. Push PRESS TO READ button (5) on ALCA. Verify display (7) indicates 00.

Ask Controller to insert his Green Controller Key in receptacle (8) on the ALCA, turn to CONTROLLER position momentarily, then remove key.


CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
SELF TEST
HIT/KILL WPN IDENT
6
7
DISPLAY
9
NOT READY
88
WEAPON
8
PRESS TO READ
CONTROLLER
5

Turn ROUNDS REMAINING switch (6) to SELF TEST. Push PRESS TO READ button (5). Verify display (7) indicates 88.

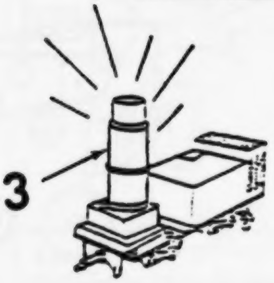
Verify NOT READY light (9) is OFF.

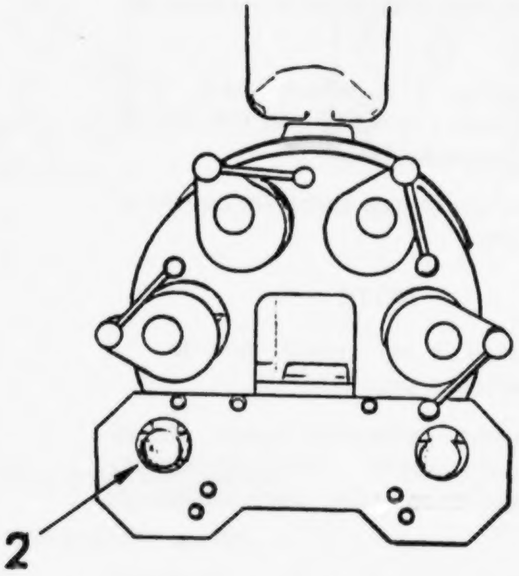
Turn ROUNDS REMAINING switch (6) to MISSILE. Press PRESS TO READ button (5). Display (7) should show 08.

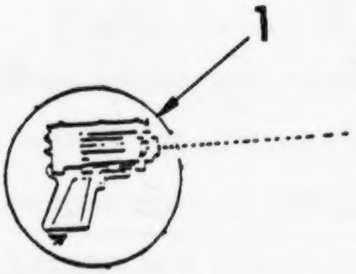
System Checkout Task 2: Checkout Detection Systems.

WARNING

During System Checkout Task 2, ensure M18 Smoke Canister is NOT installed in Smoke Indicator. Ensure that the quick release pin is removed from the extractor. Failure to comply may result in Injury to Personnel.





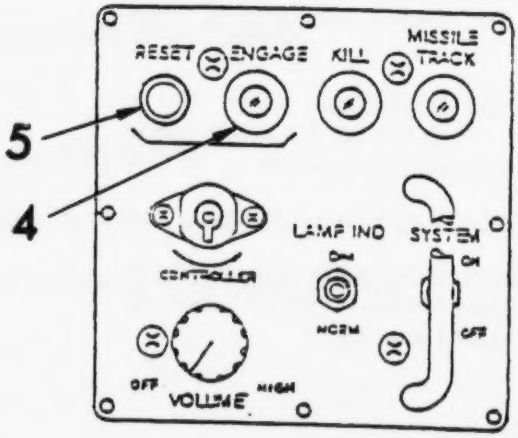


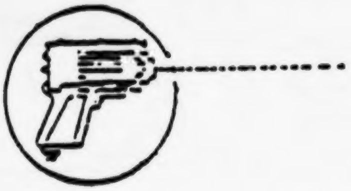
Set Controller Gun (Section II, Appendix C) to "NEAR MISS."

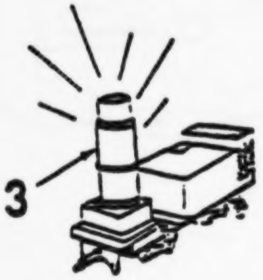
Fire Controller Gun (1) at detectors (2) on each detection system.

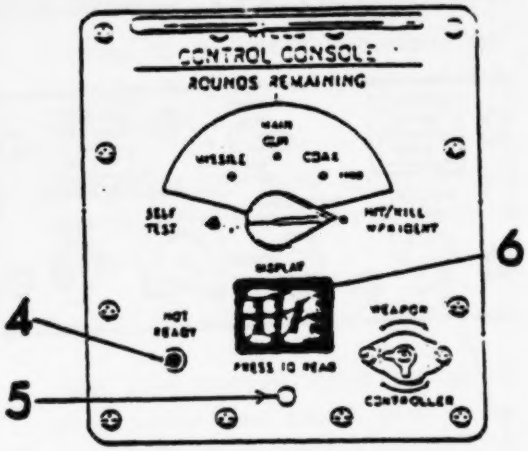
Verify that strobe (3) light flashes twice.

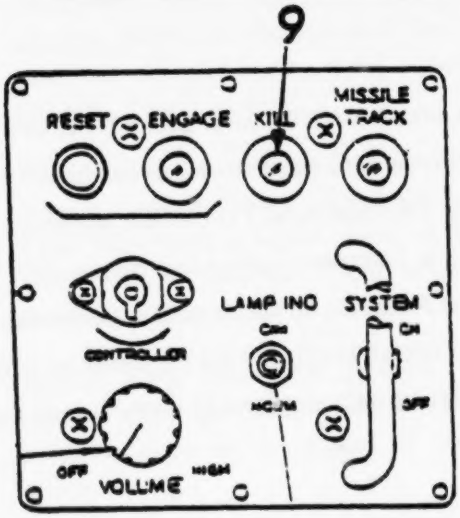
Verify CKI ENGAGE light (4) comes on. Press RESET (5) button and verify light goes off.


RESET
ENGAGE
KILL
MISSILE TRACK
5
4
CONTROLLER
LAMP IND
ON
NORM
SYSTEM
ON
OFF
OFF
VOLUME
HIGH






CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
SELF TEST
HIT/KILL
DISPLAY
NOT READY
PRESS TO READ
WEAPON
CONTROLLER
4
5
6


9
RESET
ENGAGE
KILL
MISSILE TRACK
CONTROLLER
LAMP IND
SYSTEM
ON
NORM
ON
OFF
OFF
VOLUME
HIGH

Set Controller Gun to UNIVERSAL KILL.

Fire Controller Gun at any detector on the aircraft.

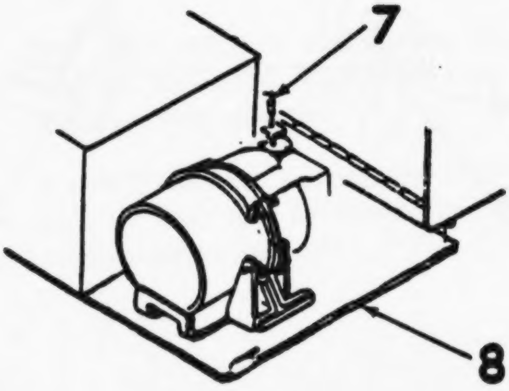
Verify that AKI (3) flashes continuously.

Verify ALCA NOT READY light (4) is on. Press PRESS TO READ button (5). Verify display (6) shows OO.

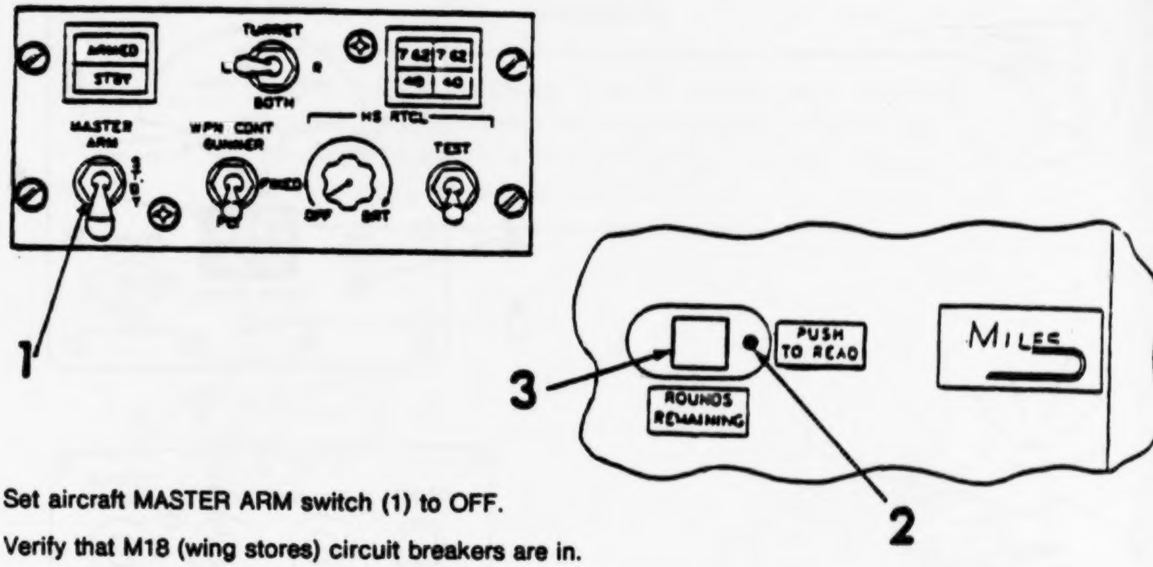
Verify pin extractor (7) on smoke indicator (8) moves in.

Verify CKI KILL light (9) is ON and intercom tone is on continuously

Ask Controller to reset ALCA.



System Checkout Task 3: Checkout (2.75-Inch Rocket) MILES Launcher Assemblies.


ARMED
STBY
TURRET
L
R
BOTH
7.62 7.62
40 40
HS RTCL
MASTER ARM
STBY
WPN CONT GUNNER
FIXED
PLT
OFF
BRT
TEST
1
3
PUSH TO READ
ROUNDS REMAINING
MILES
2

Set aircraft MASTER ARM switch (1) to OFF.

Verify that M18 (wing stores) circuit breakers are in.

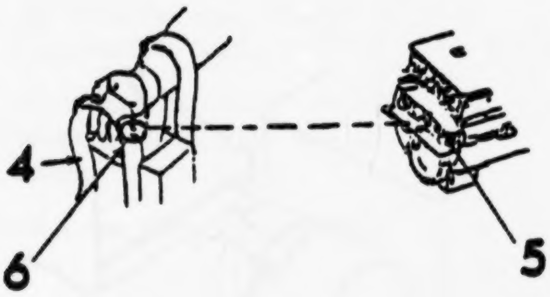
Have Controller reset TTI on both launchers using green key.

Turn to Controller position and remove key.

Press PUSH TO READ (2) button. Verify display (3) shows 19 rounds.

Turn aircraft MASTER ARM (1) switch to STBY.

On AH-1S (MC) and (ECAS), verify aircraft Rocket Management System (RMS) inventory shows 6, 8, 24.



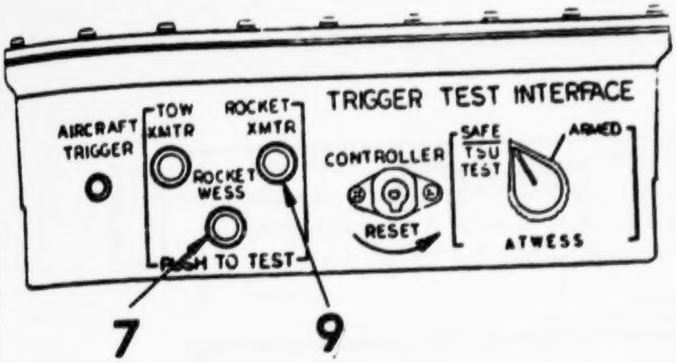
Have crew member hold a Man Worn Lase Detector (MWLD) torso harness (4) in front c laser transmitter (5). Hold it so detector (6 faces laser tube. For information on the MWLD see TM 9-1265-370-10-1.

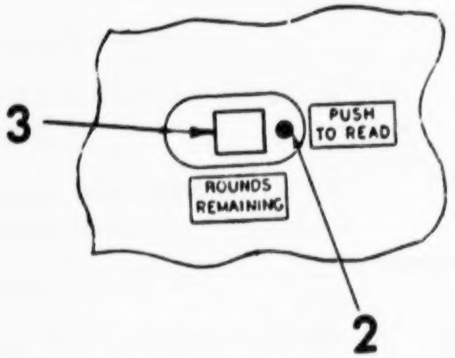
Push ROCKET WESS (7) button on TTI. Verif FLASHWESS (8) operates.

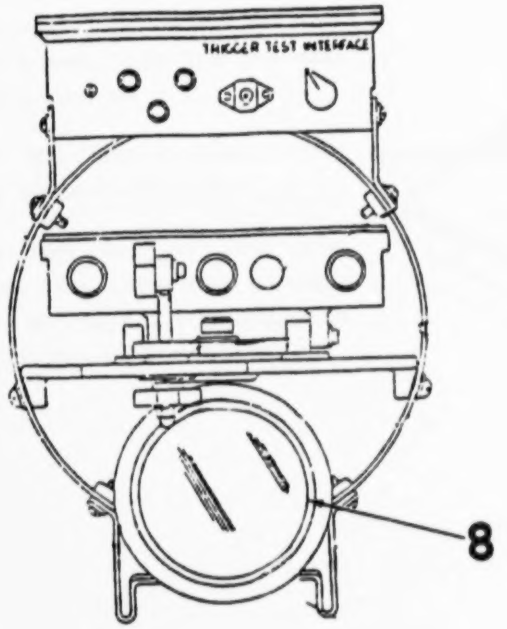
Push ROCKET XMTR (9) button on TTI. Verif alarm on MWLD sounds.

NOTE

The MWLD Torso Harness alarm is silenced by inserting a MILES supplied Yellow Key into the key receptacle on the harness (4) and turning the key in a counterclockwise direction.


TRIGGER TEST INTERFACE
AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
CONTROLLER
RESET
SAFE
TSU TEST
ARMED
ATWESS
7
9


3
PUSH TO READ
ROUNDS REMAINING
2


TRIGGER TEST INTERFACE
8

If there is no "HIT" indication, ask Controller to check out equipment and reset the MWLD.

Push PUSH TO READ (2) button on launcher pod. Verify display (3) shows 18 rounds.

Set MASTER ARM switch (1) to ARM.

Have crew member watch display (3) while gunner uses aircraft RMS to fire transmitter. Verify that firing indicators (decimal points on display) flash for at least five seconds during firing. Verify that MWLD alarm sounds.

If there is a "HIT" indication, repeat the firing test while covering Center and Left Laser Tubes with a helmet, hand, or any other opaque material. Note whether there is or is not a "HIT" indication.

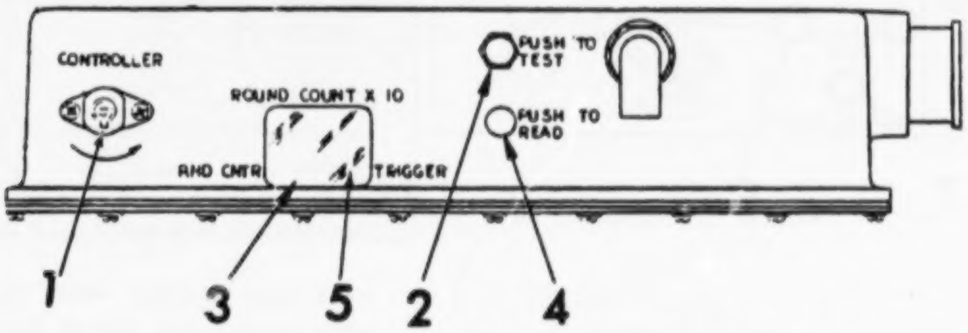
Repeat firing test while covering the Center and Right Laser Tubes. Note whether there is or is not a "HIT" indication.

Repeat firing test while covering the Left and Right Laser Tubes. Note whether there is or is not a "HIT" indication.

If a "HIT" indication was received for each of the test conditions, all Laser Tubes are firing correctly.

If a "HIT" indication was not received for each of the test conditions, go to Troubleshooting, page 3-56.

System Checkout Task 4: Checkout 20 mm Cannon Laser Transmitter.


CONTROLLER
ROUND COUNT X 10
RND CNTR
TRIGGER
PUSH TO TEST
PUSH TO READ
1
3
5
2
4

Reset Gunner's round count to 750.

Have Controller reset transmitter at key receptacle (1).

Press PUSH TO TEST button (2) for approximately 3 seconds.

Verify RND CNTR LED (3) flashes.

Press PUSH TO READ button (4).

Verify transmitter round count has decreased.

Use Gunner's trigger to fire transmitter.

Verify TRIGGER LED (5) flashes. Verify FLASHWESS operates.

Verify Gunner's round count decreases.

NOTE

The target utilized for the transmitter test must be at a distance of at least 1500 meters. Any suitable target may be used, however, it is recommended that the Multiple Range Alignment Device (MRAD), be used for any laser transmitter testing.

Set up MRAD at a range of at least 1500 meters.

Install four BA200 batteries (6).

Turn INDICATOR SELECT switch (7) to LONG RANGE.

Unlatch hinged panel assembly (8) and place in DOWN position.

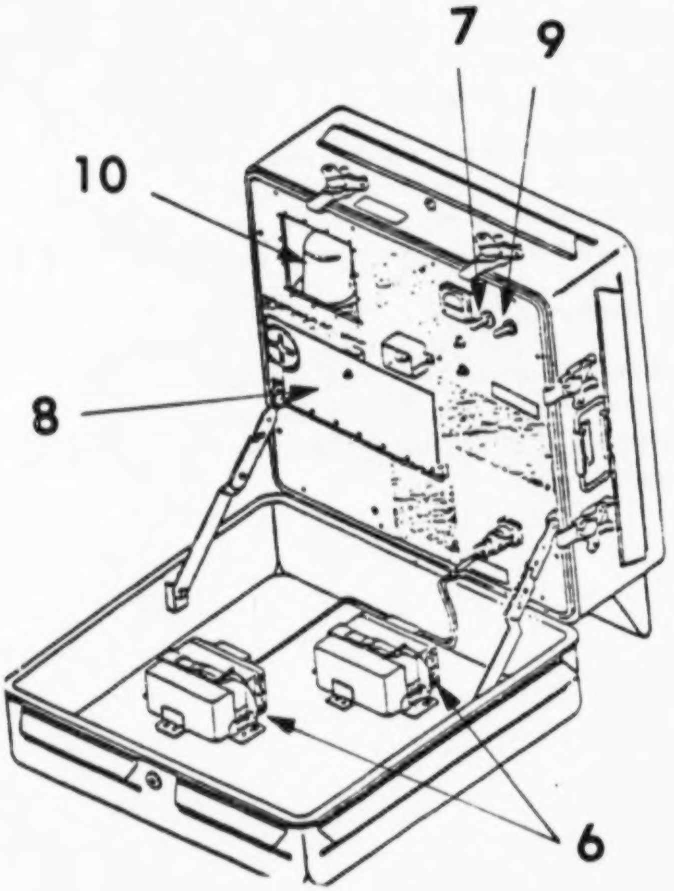
Turn POWER switch (9) ON.

Aim and fire 20 mm mounted transmitter at center of the MRAD.

The strobe light (10) on MRAD will flash each time a laser pulse from the laser transmitter is received.

If strobe light fails to flash, check transmitter alignment and retest.

If strobe light fails to flash after realignment, the transmitter boresight procedure on page 2-111 should be followed and transmitter retested.



System Checkout Task 4: Checkout 20 mm Cannon Laser Transmitter (Cont).

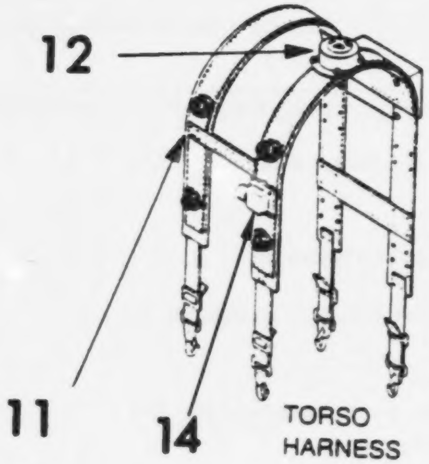
If the strobe light does not flash after reboresighting the transmitter and retesting, substitute a Man Worn Laser Detector (MWLD) Torso Harness for the MRAD, and repeat the test.

Align a detector (11) on the Torso Harness in front of the transmitter and retest. An alarm (12) on the harness should sound.

NOTE

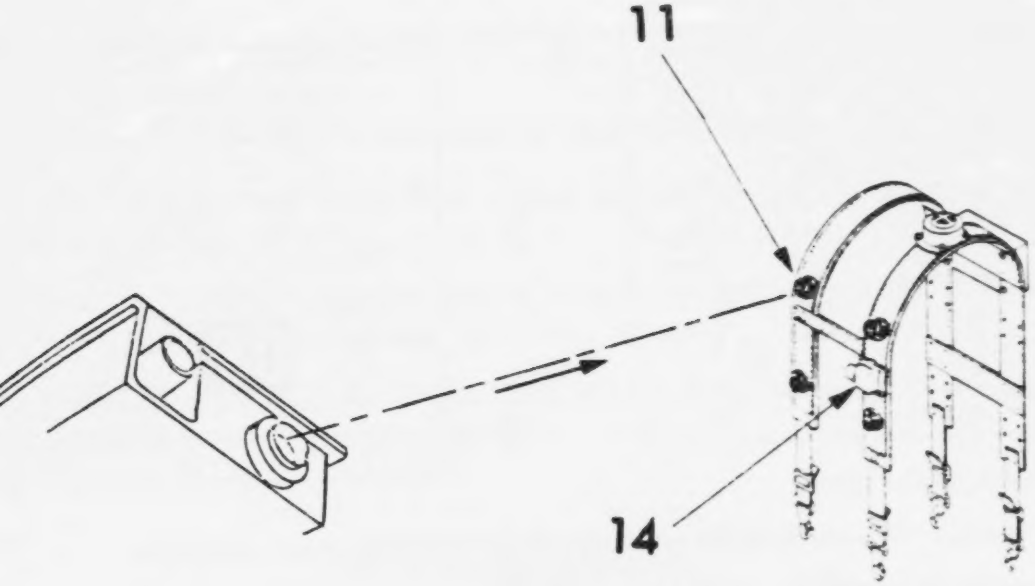
The MWLD Torso Harness alarm is silenced by inserting a MILES supplied yellow key (13) into the key receptacle (14) on the harness and turning the key in a counterclockwise direction.

If there is still no "HIT" indication, ask Controller to check out equipment and reset the CONTROLLER MODE SELECT switch.

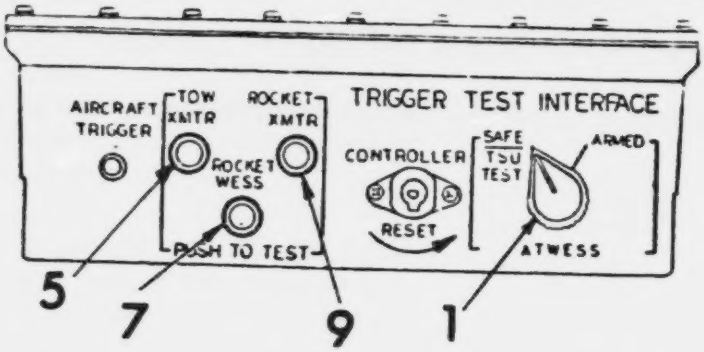


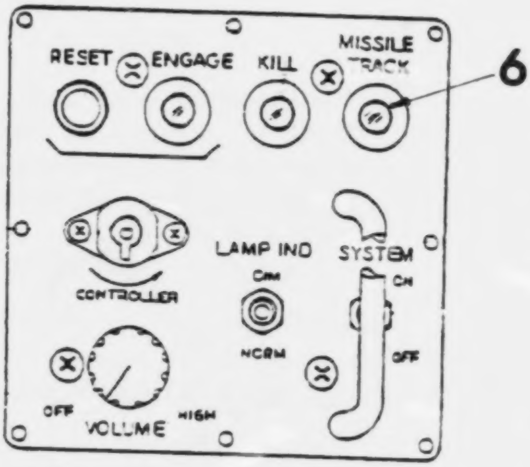
"HIT" indication was received for each of the test conditions, laser tube is firing correctly.

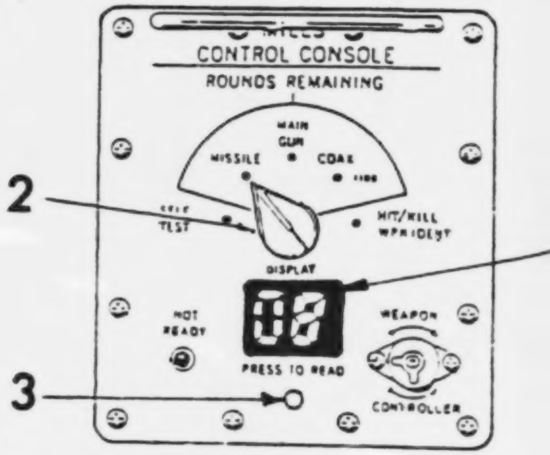
"HIT" indication was not received for each of the test conditions, go to Troubleshooting, page 3-1.



System Checkout Task 5: Checkout TOW Laser Transmitter.


AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
TRIGGER TEST INTERFACE
CONTROLLER
RESET
SAFE/TSU TEST
ARMED
ATWESS
5
7
9
1


RESET
ENGAGE
KILL
MISSILE TRACK
6
CONTROLLER
LAMP IND
DIM
NORM
SYSTEM
ON
OFF
OFF
VOLUME
HIGH


CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
SELF TEST
HIT/KILL WPN IDENT
DISPLAY
NOT READY
08
PRESS TO READ
WEAPON
CONTROLLER
2
3

Have Controller initialize system.

Set trigger interface (TTI) panel ATWESS switch (1) to SAFE/TSU TEST on both launchers.

Set ALCA switch (2) to MISSILE. Push ALCA PRESS TO READ button (3). Verify ALCA display (4) shows rounds count of 8.

Press TOW XMTR button (5) on TTI.

Verify CKI MISSILE TRACK light (6) is on for approximately 12 seconds.

Push ALCA PRESS TO READ button (3). Verify ALCA display (4) shows rounds count of 7.

NOTE

The target utilized for the transmitter test must be at a distance of at least 1500 meters. Any suitable target may be used, however, it is recommended that the Multiple Range Alignment Device (MRAD) be used for any laser transmitter testing.

Set up MRAD at a range of at least 1500 meters.

Install four BA200 batteries.

Turn INDICATOR SELECT switch (7) to LONG RANGE.

Unlatch hinged panel assembly and place in DOWN position.

Turn POWER switch (8) ON.

Have Gunner aim TSU reticle at either the MRAD or detectors of MWLD.

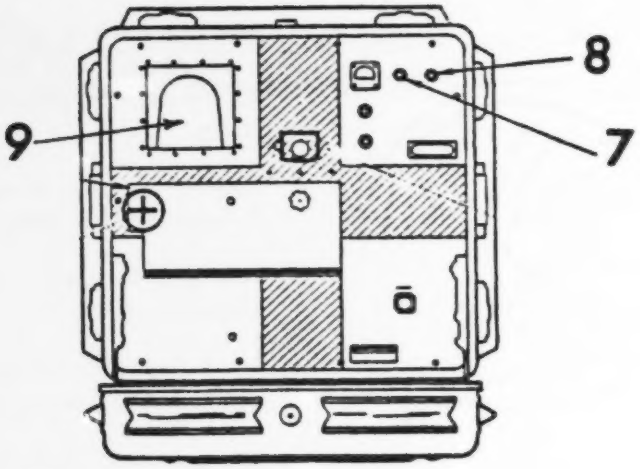
Push TOW XMTR button (5) on TTI. Verify that either MRAD or MWLD gives proper indication of laser firing.

The strobe light (9) on the MRAD will flash each time a laser pulse from the laser transmitter is received.

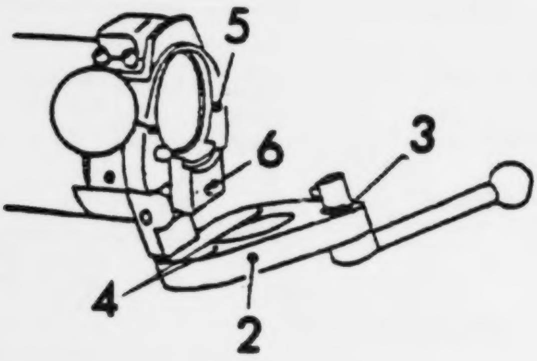
If the strobe light fails to flash, the transmitter boresight procedure on page 2-99 should be followed and the transmitter retested.

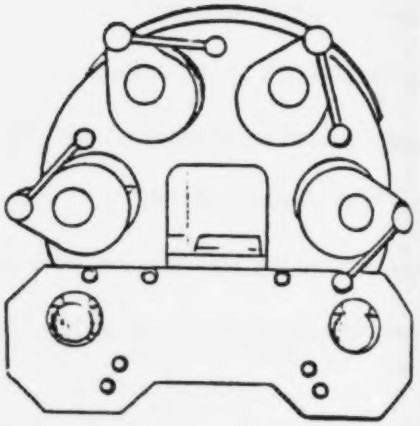
Place aircraft MODE SELECT on Gunner Instrument Panel in STBY TOW. Verify that TOW missile panel indicates MSL flags in all eight windows on Gunner Instrument Panel.

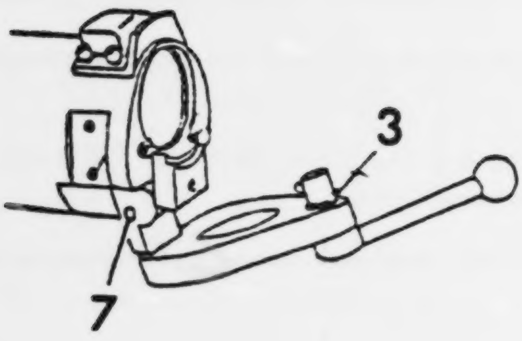
Turn ATWESS switch (1) on TTI to ARMED. Verify MSL flags drop out and barber poles appear on Gunner Instrument Panel.

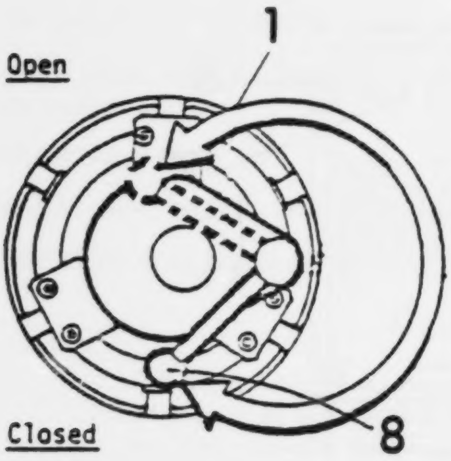


System Checkout Task 6: Checkout ATWESS.









All four ATWESS units on each pod must be checked out.

Check that ATWESS breech lock lever will move from closed position to open position (1). Check that levers fall to safe position when breeches are opened.

Use CLP (Item 4, Section II, Appendix D) to clean powder from breech doors (2) breech lock levers (3) and contacts (4) in breech doors.

Use CLP to clean powder from terminals (5) in breech blocks. Clean entire breech block.

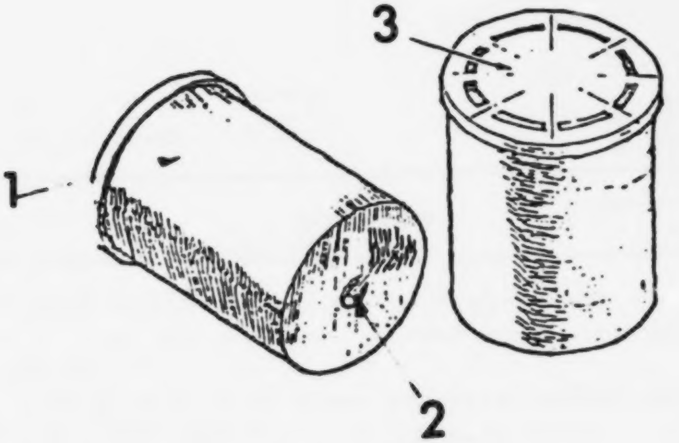
Use CLP to clean powder from cartridge extractors (6).

Put a drop of CLP at breech door hinges (7) and breech lock levers (3).

Close breech doors and move levers to closed position (8).

WARNING

Treat ATWESS cartridges as you would live ammunition. A sharp blow may set off the ATWESS cartridge.



Inspect ATWESS cartridges for cracks in plastic cartridge case (1), dented primer (2), and tears or punctures in copper disk (3). Replace damaged cartridges.

OPERATIONAL TASKS - LIST

Task	Title	Page
1.	Initialize MILES System	2-133
2.	Complete Operator and Crew Member Checklist	2-136
3.	Install Smoke Grenade	2-141
4.	Install ATWESS Cartridges	2-142
5.	Observe Your Target	2-145
6.	Recognizing Enemy Fire	2-146
7.	Resetting System After a "KILL"	2-148

WARNING

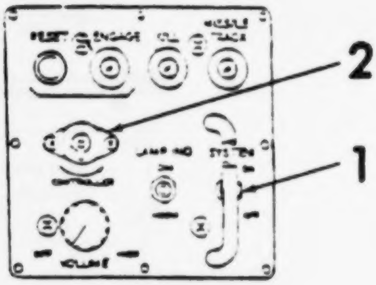
Before initializing the MILES system, make sure all safety switches and arming levers are in their SAFE positions.

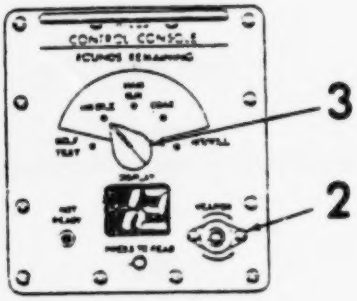
If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

NOTE

The SYSTEM ON/OFF switch is for emergency use only. It shuts down the MILES and isolates it from other aircraft systems. If switch is turned OFF during an exercise, MILES will no longer operate until reset by a Controller.

Operational Task 1: Initialize MILES System.


RESET
ENGAGE
MISSILE TRACK
CONTROLLER
SYSTEM
VOLUME
2
1


CONTROL CONSOLE
ROUNDS REMAINING
MISSILE
SELF TEST
PUSH TO READ
3
2

Turn CKI system power ON/OFF switch (1) to ON.

Initialize ALCA and TOW missile systems by inserting Controller Key (green) in either CKI or ALCA receptacles (2). Cycle key to and from CONTROLLER position. Remove key.

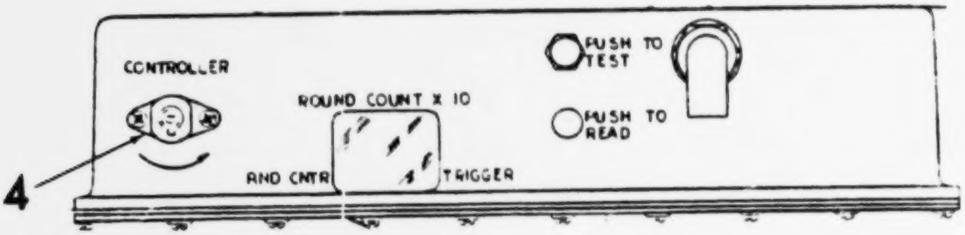
Select MISSILE on ALCA switch (3). Press PUSH TO READ Verify display shows number 08.

Initialize 20 mm gun system by inserting Controller Key into key receptacle (4) located on the 20 mm transmitter assembly.

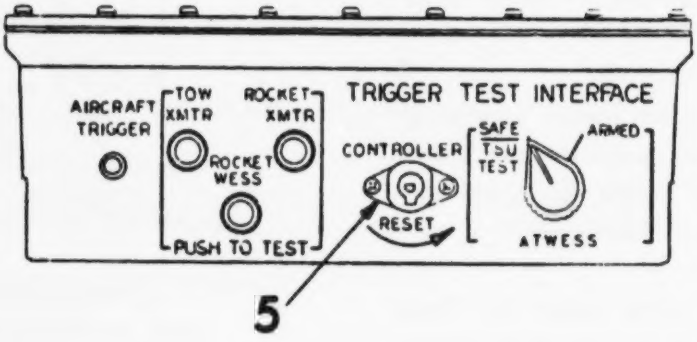
Reset aircraft Rounds Remaining indicator and follow normal aircraft operating procedures.

NOTE

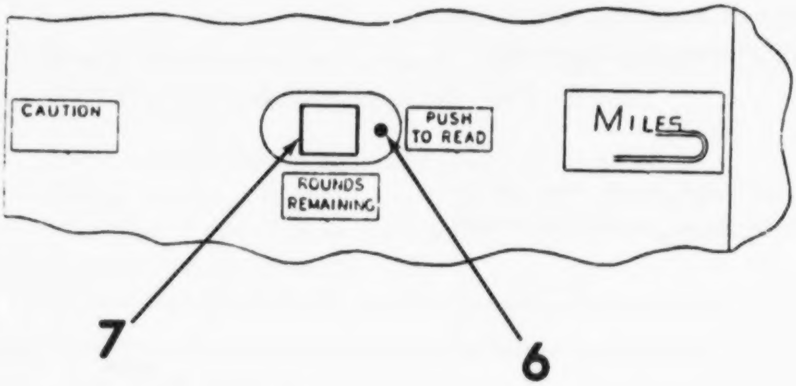
Aircraft MASTER ARM switch must be in the OFF position prior to loading rocket quantity.


CONTROLLER
ROUND COUNT X 10
RND CNTR
TRIGGER
PUSH TO TEST
PUSH TO READ
4

Operational Task 1: Initialize MILES System (Cont).


AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
TRIGGER TEST INTERFACE
CONTROLLER
RESET
SAFE
TSU TEST
ARMED
ATWESS
5

Insert Controller Key in receptacle (5) on both TTI boxes. Initialize rocket system.


CAUTION
PUSH TO READ
ROUNDS REMAINING
MILES
7
6

Press PUSH TO READ button (6) on side of rocket transmitter. Verify that rocket Rounds Remaining - 19 - appears in display (7) on both launchers.

Make sure the following aircraft switches are set as follows:

Left wing store circuit breaker - ON

Right wing store circuit breaker - ON

Fire Control Computer (FCC) on AH-1S (MC) - OFF

Head Up Display (HUD) mode on AH-1S (MC) - STADIAMETRIC

Head Up Display (HUD) Rocket Switch on AH-1S (MC) - INDIRECT

TURRET SLEW on AH-1S (MC) - GND TEST

TURRET SLEW on AH-1S (ECAS) - SLOW

LASER SAFE/TURRET DEPR. LIMIT - ON

RANGE switch (Pilot and Gunner) - SHORT

Operational Task 2: Complete Operator and Crew Member Checklist.

Perform the following Operator and Crew Member Checklist:

BEFORE INTERIOR AND EXTERIOR CHECK

WARNING

Do not preflight until all safety switches and arming levers are set to their SAFE positions.

1.	Launcher systems	SAFE
2.	Cockpit Kill Indicator (CKI) system ON/OFF switch	OFF

EXTERIOR CHECK

FUSELAGE, FRONT

1.	20 mm laser transmitter secure to 20 mm barrels.	CHECK
2.	20 mm laser transmitter electrical cable secured by fastener strap.	CHECK
3.	20 mm FLASHWESS secured to 20 mm barrels with cotter pin installed.	CHECK
4.	20 mm FLASHWESS electrical cable secured by fastener strap.	CHECK
5.	20 mm gun anti-rotation plunger secured.	CHECK
6.	20 mm turret cables secured by fastener straps and not interfering with turret movement. Cable loops minimized.	CHECK

FUSELAGE, LEFT SIDE

1.	Turret access door spacer secured.	CHECK
2.	Cable secured by clamps. Cable excess loops minimized.	CHECK
3.	Sail detector belt snug to airframe.	CHECK
4.	Sail detector cable and lanyard secure.	CHECK
5.	Sail detector electrical cable secured by flaps and cable routed through elastic keepers.	CHECK
6.	Sail detectors aligned to white color dots.	CHECK
7.	Launcher secured to inboard wing store station and sway braces tightened.	CHECK
8	Launcher electrical connectors secure and lanyard is fastened to aircraft.	CHECK
9.	Launcher electrical cables secured to aircraft by fastener straps.	CHECK
10.	TOW detector rail secured to upper outboard wing store station.	CHECK
11.	TOW detector rail electrical connector secured to mounting clip and lanyard fastened to aircraft.	CHECK
12.	TOW detector electrical cable secured to aircraft by fastener straps and pads.	CHECK
13.	TOW launch rack cable stowed on TOW detector rail by fastener strap.	CHECK
14.	AKI/Smoke indicator secured to skid.	CHECK
15.	AKI/Smoke indicator jam nuts secured.	CHECK
16.	AKI/Smoke indicator safety pin secured.	CHECK
17.	AKI/Smoke indicator electrical connector P1 and P3 connected.	CHECK
18.	AKI/Smoke indicator electrical cables connected to aircraft by clamps, fastener straps, and fastener tape pads.	CHECK

Operational Task 2: Complete Operator and Crew Member Checklist (Cont).

FUSELAGE, RIGHT SIDE

1. Cables secured by clamps. Cable excess loops minimized. CHECK
2. Sail detector belt snug to airframe. CHECK
3. Launcher secured to inboard wing store station and sway braces tightened. CHECK
4. Launcher electrical connectors secure and lanyard fastened to aircraft. CHECK
5. Launcher electrical cables secured to aircraft by fastener straps and fastener pads. CHECK
6. TOW detector rail secured to upper outboard wing store station. CHECK
7. TOW detector rail electrical connector secured to mounting clip and lanyard fastened to aircraft. CHECK
8. TOW detector electrical cable secured to aircraft by fastener straps and fastener pads. CHECK
9. TOW launch rack cable stowed on TOW detector rail by fastener strap. CHECK

INTERIOR

AMMUNITION BAY

1. ALCA mounting assembly secured by ammunition bay locking pins. CHECK
2. ALCA battery boxes secured by quick release latches CHECK
3. ALCA connectors secured and cables stowed by fastener straps. CHECK
4. 20J332 connector secured by dust cap chain to mounting hole in ammunition bay forward wall. CHECK

PILOT'S COMPARTMENT

1.	CKI secured to instrument panel.	CHECK
2.	CKI cable secured by fastener straps.	CHECK
3.	Headset cable routing secured by fastener straps.	CHECK
4.	TOW Programmer Interrupt Control Panel secured to instrument panel.	CHECK
5.	TOW Programmer Interrupt Control Panel connector secured to rear of unit.	CHECK
6.	FCC circuit breaker on armament circuit breaker panel.	OFF
7.	Wing Store Left and Right gun circuit breakers on Armament Circuit Breaker Panel.	ON

NOTE

Follow standard operating procedure on all other armament circuit breakers.

8.	Heads Up Display (HUD) - Mode	STAD
9.	Heads Up Display (HUD) - Rocket	DIR
10.	RANGE swtich	SHORT POSITION
11.	CKI system ON/OFF switch.	ON
12.	Verify that MILES system is initialized (Operational Task 1 is completed)	CHECK

Operational Task 2: Complete Operator and Crew Member Checklist (Cont).

GUNNER'S COMPARTMENT

1.	TSU cables routed and secured by fastener straps.	CHECK
2.	TSU and CKI cables routed and secured by floor plate and grommet before takeoff.	CHECK
3.	RANGE switch	SHORT POSITION
4.	GUNNER'S RND COUNT	same as 20 MM TRANSMITTER

BEFORE TAKEOFF

1.	Load smoke device with M18 smoke grenade only.	LOADED

WARNING

Keep clear of area directly behind launcher during steps 2, 3, and 4.

2.	Load launcher ATWESS.	LOADED
3.	Launcher PULL TO ARM levers.	PULL
4.	TTI ATWESS SAFE/ARM switch.	ARMED

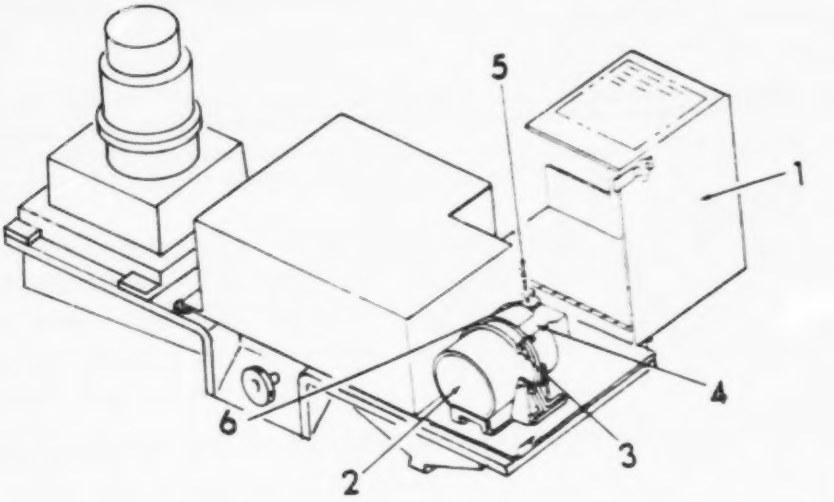
BEFORE LEAVING HELICOPTER

1.	ALCA DISPLAY switch.	HIT/KILL WPN IDENT
2.	PRESS TO READ on ALCA	Momentarily press Read and note number.
3.	TTI ATWESS SAFE/ARM switches and arming levers on both launchers.	SAFE

erational Task 3: Install Smoke Grenade.

WARNING

M18 Smoke Canisters are the ONLY canisters authorized for use with the AKI Smoke Assembly. Care should be taken when handling expended canisters as they are initially hot to the touch. Failure to comply may result in injury to personnel.



JUST PRIOR TO TAKEOFF, install an M18 smoke grenade in the smoke indicator mounted on the left skid tube.

Unlatch and swing open canister cover (1).

Install M18 smoke grenade (2) (Item 6, Section II, Appendix D) in canister clamp (3) with spoon up. Secure grenade by securing clamp (4). Ensure that clamp does not restrict movement of grenade spoon (5).

Pull extractor shaft out to its extended position.

Connect clip (6) of extractor shaft to ring (7) of M18 smoke grenade. Insert locking pin.

Close and latch canister cover (1).

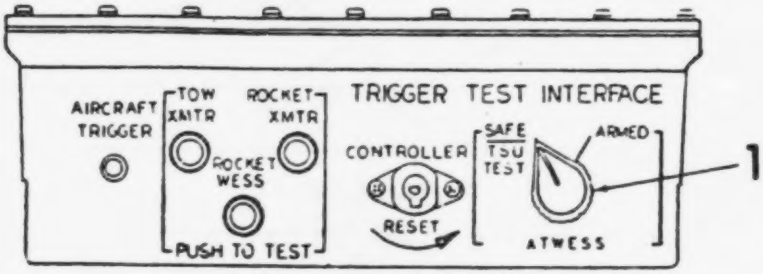
If operating without a smoke grenade, make sure extractor shaft is pushed into the smoke indicator housing.

Operational Task 4: Install ATWESS Cartridges.

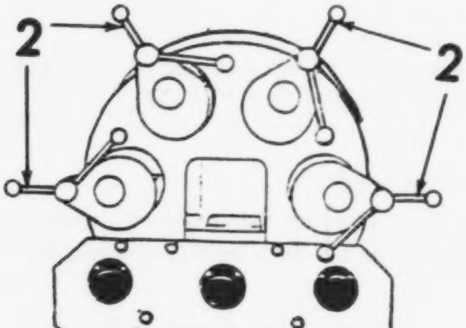
WARNING

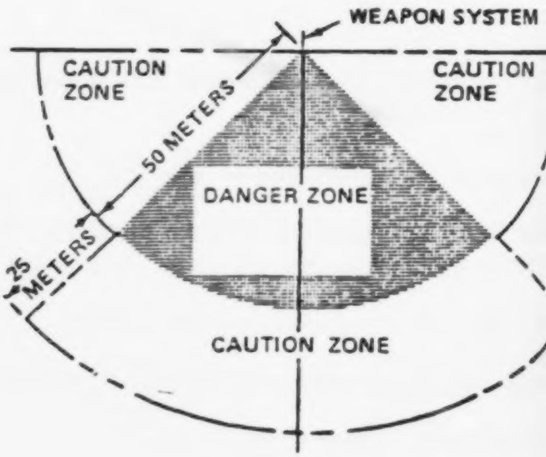
Never arm an ATWESS until you are ready for a mission. Handle ATWESS cartridges with the same care you use with live ammunition. A sharp blow may set off ATWESS cartridge. Failure to comply may result in injury to personnel.

Before takeoff, ATWESS cartridges must be inserted in the ATWESS assemblies. There are four ATWE firing devices located in each 2.75-inch rocket pod (total of 8 ATWESS devices). Each firing devi requires one ATWESS cartridge to be installed.


AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
TRIGGER TEST INTERFACE
CONTROLLER
RESET
SAFE
TSU TEST
ARMED
ATWESS
1

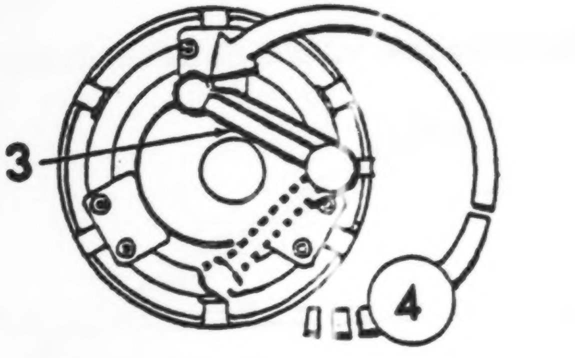
Place ATWESS switch (1) on TTI panel to the SAFE position. Make sure all PULL TO ARM switches (are in safe positions.




WEAPON SYSTEM
CAUTION ZONE
CAUTION ZONE
50 METERS
DANGER ZONE
25 METERS
CAUTION ZONE

Load inboard cartridges first by going under the stub wing. Stay clear of back blast area. Do not arm this time.

Move breech lock levers (3) to open position (4).



Open breech doors (5) as far as they go.

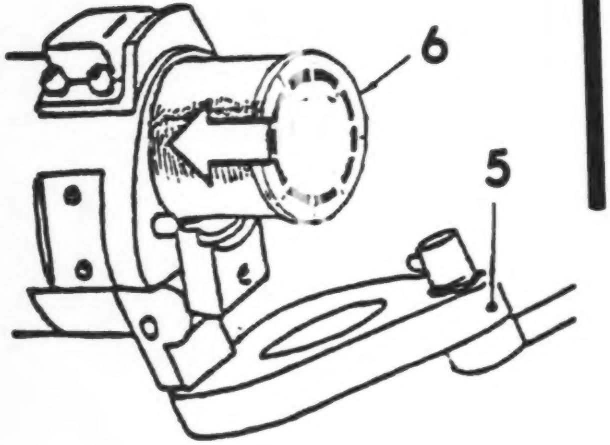
Visually check for protruding firing pin.

If uncertain, use one hand to feel if firing pin has retracted to its full length.

If firing pin is protruding, or has not retracted to it's full length, tag weapon as unsafe and return to point of issue.

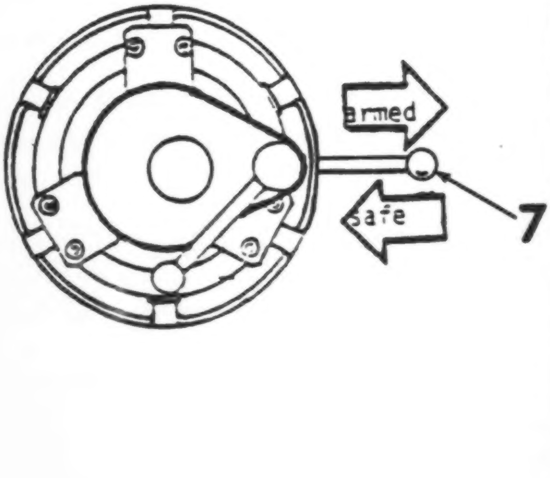
Failure to follow these instructions could result in personnel being burned by blast pressure emissions escaping through hole in center of breech door.

Insert an ATWESS cartridge (6) in each TOW simulator. Load from inboard to outboard sides. Load two outboard cartridges by reaching over the TOW launch rack. Stay clear of back blast area.



Stand to the right side of rear of launcher, facing away from target, use right hand to close breech door and move breech lock lever to closed position.

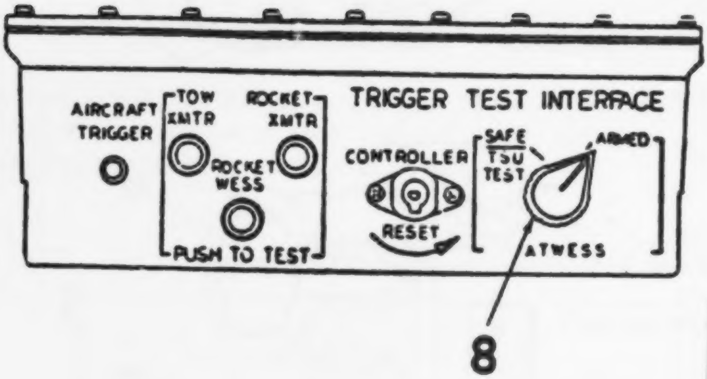
Stand on left side of aircraft out of danger zone of tow weapon system, face toward rear of aircraft, use left hand to close lower inboard breech door of tow simulator and move breech lock lever to closed position.

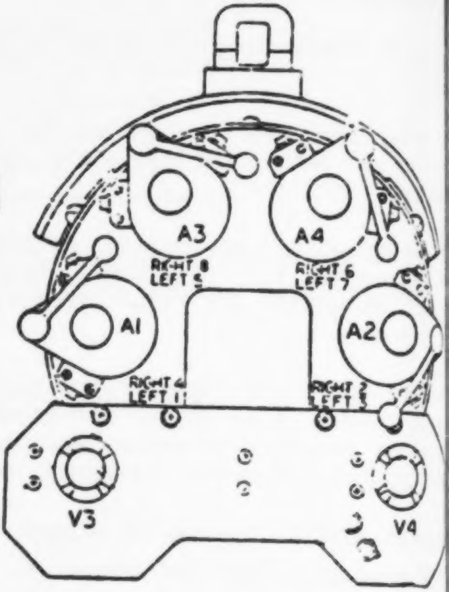


Perform same tasks to upper inboard simulator and then lower inboard breech door. Finally, upper outboard breech simulator.

Walk around aircraft, face toward front, use left hand to perform same tasks in same sequence as stated above.

Operational Task 4: Install ATWESS Cartridges (Cont).


AIRCRAFT TRIGGER
TOW XMTR
ROCKET XMTR
ROCKET WESS
PUSH TO TEST
TRIGGER TEST INTERFACE
CONTROLLER
RESET
SAFE
TSU TEST
ARMED
ATWESS
8


A3
A4
RIGHT 8 LEFT 5
RIGHT 6 LEFT 7
A1
A2
RIGHT 4 LEFT 1
RIGHT 2 LEFT 3
V3
V4

Repeat steps for the other pod.

Ensure that back blast area is clear of all personnel and equipment. Turn ATWESS switch (8) on TTI to ARMED position.

If you decide not to fire, place ATWESS switch on TTI panel to the SAFE position. Push all eight safety levers to SAFE position. Open breech doors and remove cartridges.

Operational Task 5: Observe Your Target.

The effect of your MILES-equipped weapon fire can be evaluated by observing your target during training exercise.

If detectors are hit by laser fire, alarms on vehicle CVKIs and Aircraft AKIs will flash and personnel MWLDs will sound. Usually, you will not be close enough to hear the alarms.

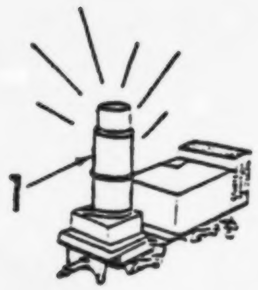
If a vehicle or aircraft is "HIT" but not "KILLED," CVKI or AKI light flashes four to six times.

If a vehicle or aircraft is "NEAR MISSED," CVKI or AKI light flashes twice.

If you "KILL" personnel, soldiers remove Yellow Keys from laser transmitters and insert in their MWLDs to turn off buzzers.

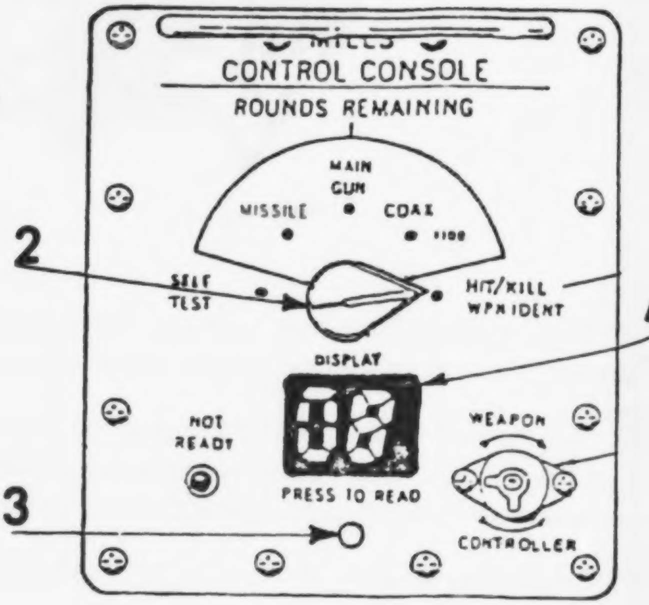
Operational Task 6: Recognizing Enemy Fire.

If you are hit by laser fire, AKI (1) will flash. You will also hear tones on your intercom unit. A brief alarm (two AKI flashes and two intercom beeps) means a "NEAR MISS." Repeated (four to six intercom tones and four to six AKI flashes) means a "HIT." A continuous alarm means a "KILL."



To determine what kind of weapon has fired on you, after you land, turn the switch (2) on the ALCA, located in the 20 mm ammunition bay, to the HIT/KILL position. Press the PRESS TO READ button (3). Display (4) will show a number. Use the chart below to match the number on the display.

Display Number	Weapon
00	Controller Gun
07	TOW or Shillelagh
08	Dragon
12	105 mm
13	152 mm
14	2.75-inch Rocket
15	Viper
23	20 mm Cannon
24	M2/M85
25	Chaparral
26	Stinger
99	Self-Kill

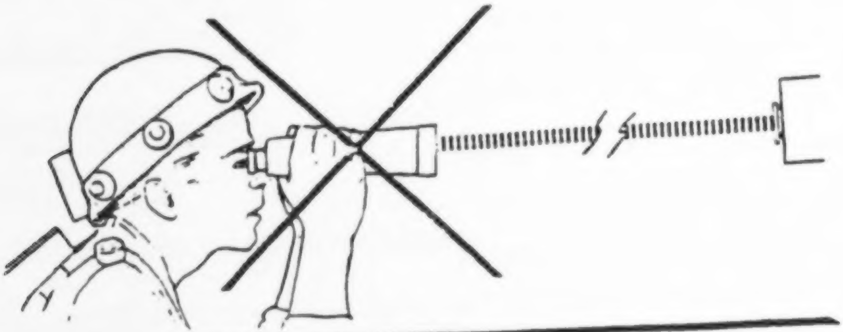

CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
SELF TEST
HIT/KILL WPN IDENT
DISPLAY
NOT READY
PRESS TO READ
WEAPON
CONTROLLER
2
3

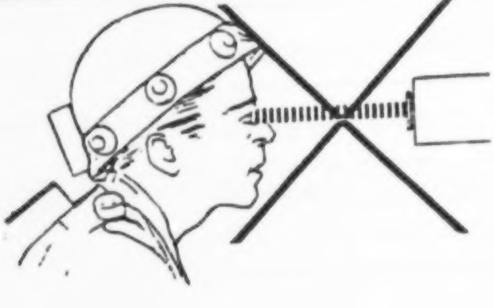
A "SELF-KILL" display code occurs only during system checkout.

WARNING

Although the laser light emitted by MILES laser transmitters is considered eye safe by the Bureau of Radiological Health, suitable precautions must be taken to avoid possible eye damage from overexposure to this radiated energy. Precautionary measures include the following:

- **Avoid viewing the laser emitter at close range** (less than 12 meters). Increasing the eye-to-laser distance greatly reduces the risks of overexposure.
- **Avoid viewing the laser emitter directly along the optical axis of** the radiated beam.
- **Especially avoid viewing the laser emitter through magnifying optics** at engagement ranges of less than **75 meters** for STINGER, VULCAN, and TOW, and **110 meters** for the CHAPARRAL.
- **Avoid** allowing personnel with **optics of higher transmission** or **magnifying** power than **normal tank optics** to view STINGER, Vulcan, or TOW within **150 meters** or the CHAPARRAL within **330 meters**.



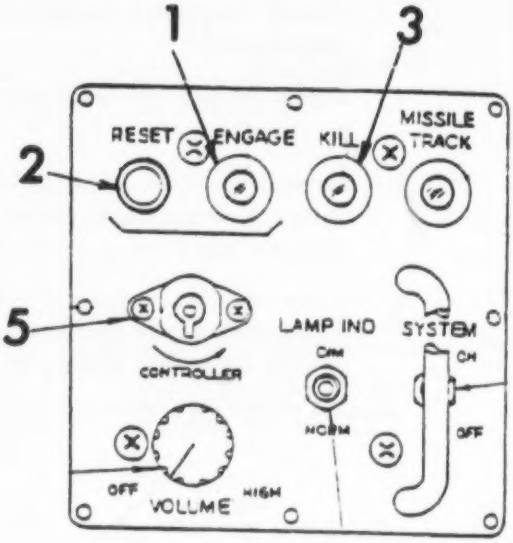


Operational Task 7: Resetting System After a KILL.

NOTE

If your helicopter is KILLED, return to your base (unless otherwise instructed). Your AH-1S/MILES system must be RESET by the Controller and the spent M18 Smoke Canister replaced.

Resetting the AH-1S/MILES system consists of the following:


1
3
2
5
RESET
ENGAGE
KILL
MISSILE TRACK
CONTROLLER
LAMP IND
SYSTEM
ON
OFF
NORM
OFF
VOLUME
HIGH

ENGAGE light (1) on CKI may be RESET at any time by pressing the RESET button (2).

KILL light (3) on CKI must be reset by a Controller after the helicopter lands.

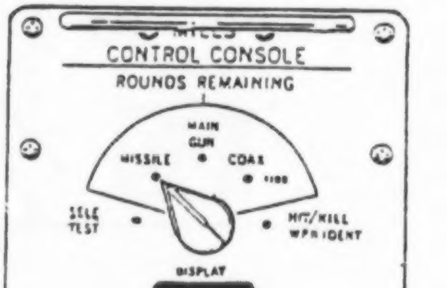
After the aircraft lands, the Controller resets the system by inserting his Controller (Green) Key in the receptacle (4) on the ALCA, turning to the CONTROLLER (5) position momentarily, then removing the key.

NOTE

If ENGAGE light on CKI comes on when Controller resets system, depress reset switch and ENGAGE light will extinguish.

Remove and replace spent M18 Smoke Canister.

Have Controller check condition of batteries using his MILES System Test Set.


CONTROL CONSOLE
ROUNDS REMAINING
MAIN GUN
MISSILE
COAX
SELF TEST
HIT/KILL WPN IDENT
DISPLAY
NOT READY
08
PRESS TO READ
WEAPON
CONTROLLER

WARNING

In inclement weather, you should shut off the AKI strobe to prevent experiencing vertigo during flight. AKI strobe is extinguished by turning CKI system POWER switch OFF.

POSTOPERATIONAL TASKS - INDEX. Remove, inspect, service and return all MILES equipment following completion of training exercise.

Task	Title	Page
1.	ATWESS and M18 Smoke Canister Postoperational Task	2-149
2.	Inside Postoperational Tasks	2-149
3.	Outside Postoperational Tasks	2-150
4.	Transit Case Packing Instructions	2-151
5.	Return Equipment	2-154

NOTE

If you need additional information on completing a postoperational task, turn to referenced section. Postoperational task will be reverse of referenced section.

Postoperational Task 1: ATWESS and M18 Smoke Canister Postoperational Task.

Remove any ATWESS cartridges.

Remove any M18 Smoke Canisters.

Postoperational Task 2: Inside Postoperational Tasks.

Remove and inspect MILES inside cables. See Inside Cable Installation Tasks 2, 3, 4 and 5 (See page 2-20).

Remove TOW Program Interrupt Control Panel. See Inside Installation Tasks 4 and 5 (See page 2-13).

Remove and inspect Cockpit Kill Indicator. See Inside Installation Tasks 2 and 3 (See page 2-13).

Remove and inspect Floor Plate. See Inside Installation Tasks 6 and 7 (See page 2-13).

Postoperational Task 3: Outside Postoperational Tasks.

Remove and inspect MILES Cable Assemblies. See Outside Cable Installation Tasks 18 and 19 (See p 2-58).

Remove and inspect Sail Detector Belt. See Outside Installation Tasks 2 and 3 (See page 2-58).

Remove and inspect TOW Launch Rack Assemblies. See Outside Installation Tasks 4 and 5 (See p 2-31).

Remove and inspect Aircraft Kill Indicator and Smoke Indicator Assemblies. See Outside Installat Tasks 8 and 9 (See page 2-31).

Remove and inspect Aircraft Weapon (2.75-inch Rocket) MILES Launcher Assemblies. See Outs Installation Tasks 6 and 7 (See page 2-31).

Remove and inspect ALCA and Battery Boxes. Remove batteries. See Outside Installation Tasks 10 a 11 (See page 2-31).

Remove and inspect FLASHWESS. See Outside Installation Tasks 14 and 15 (See page 2-31).

Remove and inspect 20 mm Cannon Laser Transmitter. See Outside Installation Tasks 12 and 13 (S page 2-31).

Remove MILES Barrel Locking Plunger Assembly. See Outside Installation Task 13 (See page 2-53).

CAUTION

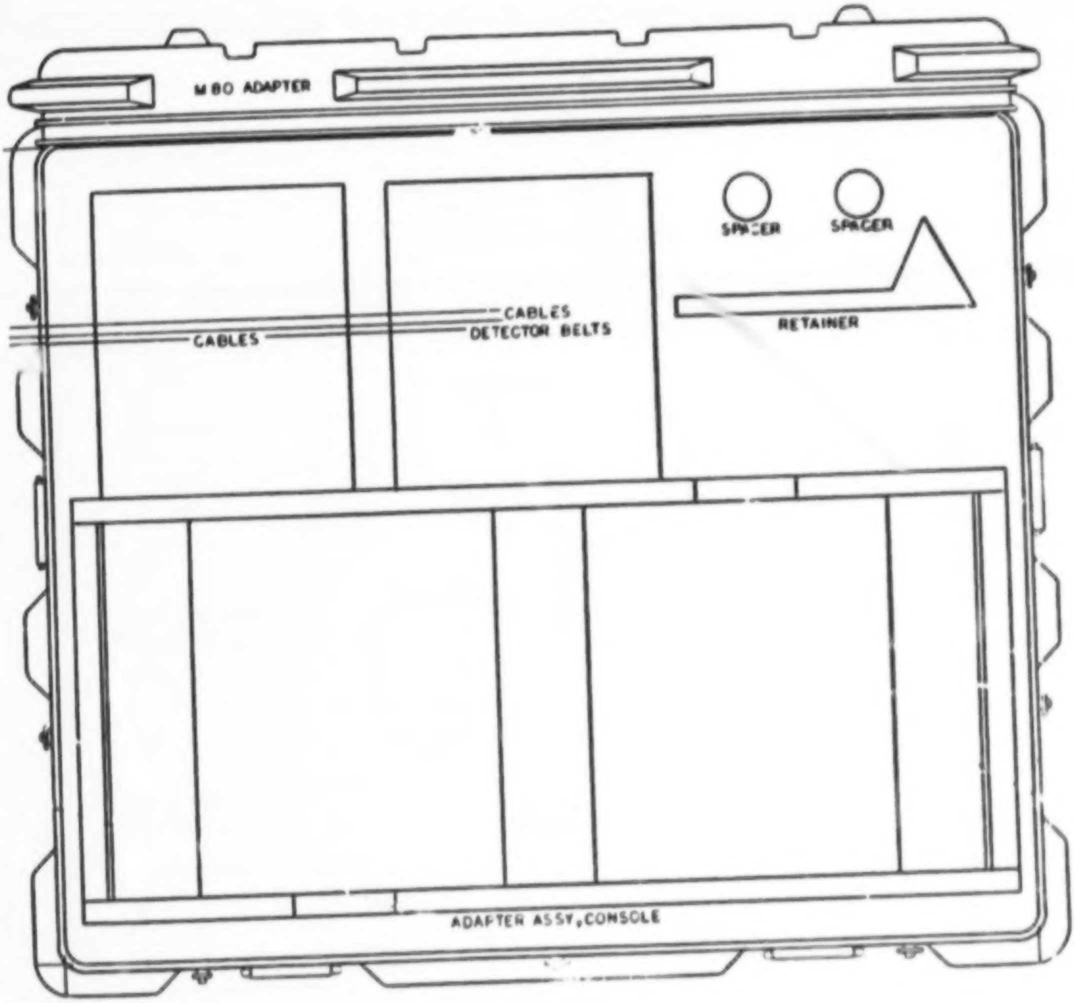
Timing pin from 20 mm Receiver must be replaced or 20 mm Gun will not operate correctly. Failure to comply may result in damage to the system.

Postoperational Task 4: Transit Case Packing Instructions.

a. Store MILES AH-1S:

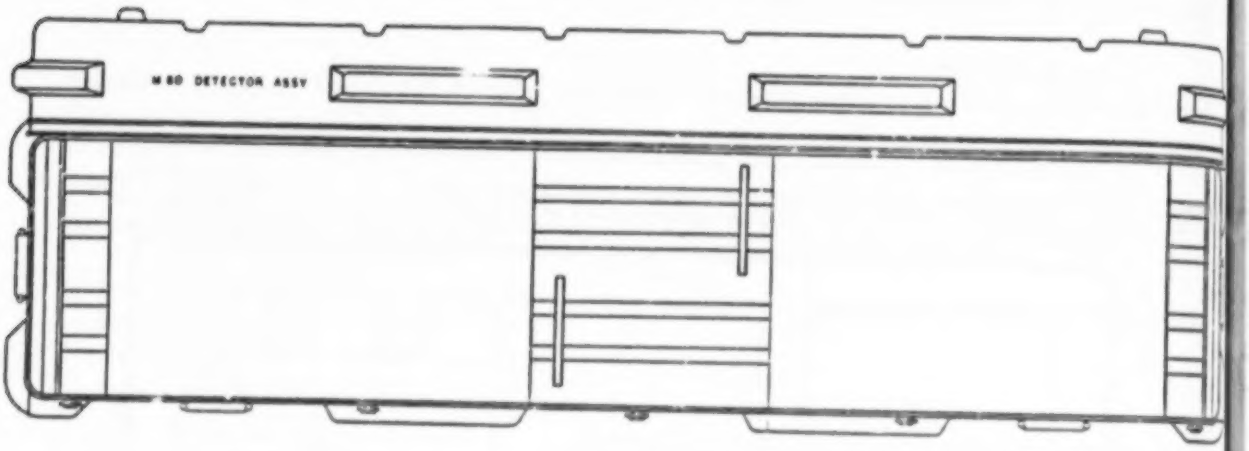
- Cables
- Detector belts
- Adapters
- Spacers
- Retainer

In spaces shown.


M 80 ADAPTER
SPACER
SPACER
CABLES
DETECTOR BELTS
CABLES
RETAINER
ADAPTER ASSY, CONSOLE

Postoperational Task 4: Transit Case Packing Instructions (Cont).

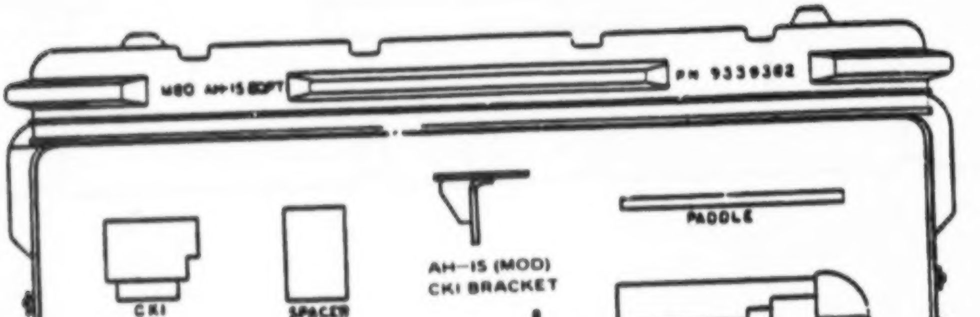
b. Store MILES AH-1S detector assembly and TOW launch rack in this transit case.


M 60 DETECTOR ASSY

c. Store MILES AH-1S:

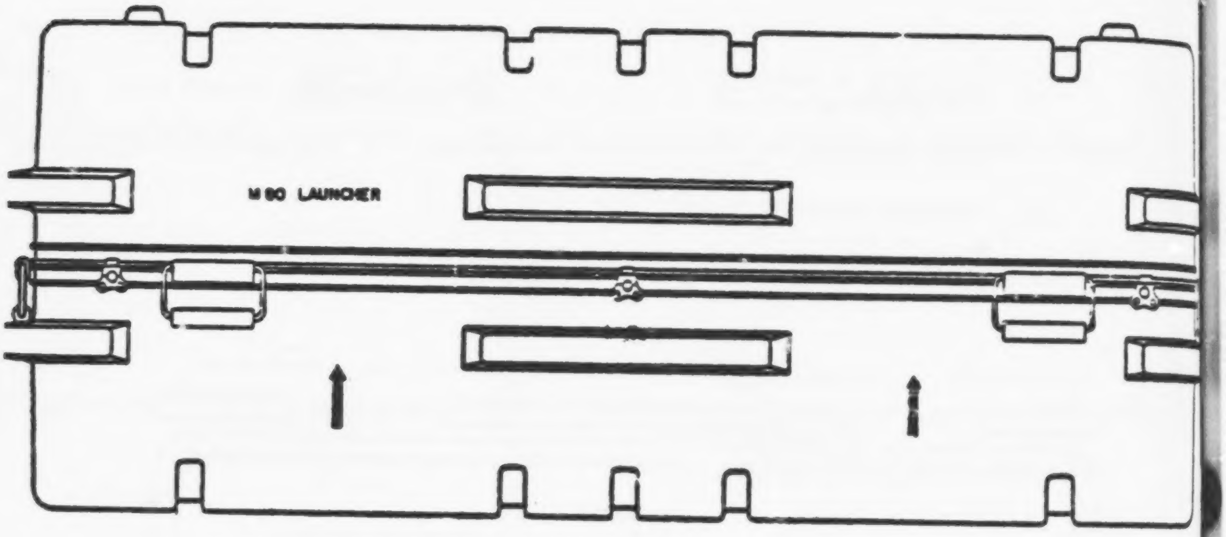
- CKI
- Spacer
- AH-1S (MOD) CKI bracket
- Paddle
- Floor plate
- Laser transmitter
- Attaching hardware
- FLASHWESS
- Control panel
- Plunger
- AKI/Smoke
- Indicator assembly
- Manual

In spaces shown.


MEO AH-1S EQPT
PN 9339362
CKI
SPACER
AH-1S (MOD)
CKI BRACKET
PADDLE
FLASHWESS
FLOOR PLATE
CONTROL PNL
PLUNGER
XMTR
HARDWARE
MANUAL
INDICATOR ASSY
AKI/SMOKE

Postoperational Task 4: Transit Case Packing Instructions (Cont).

d. Store MILES AH-1S launcher in this transit case.



Postoperational Task 5: Return Equipment.

Return all equipment to your NCOIC.

Include: All MILES equipment.

Unused ATWESS cartridges

Unused M18 smoke canisters

Special tools

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

Under unusual conditions, operational procedures for the MILES equipment have the same limitations as the AH-1S Attack Helicopter.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

SECTION I. LUBRICATION INSTRUCTIONS

The TOW launcher tubes require operator lubrication in the MILES AH-1S Helicopter System.

Before use and as needed during operation of the TOW simulator tubes, perform the following procedures.

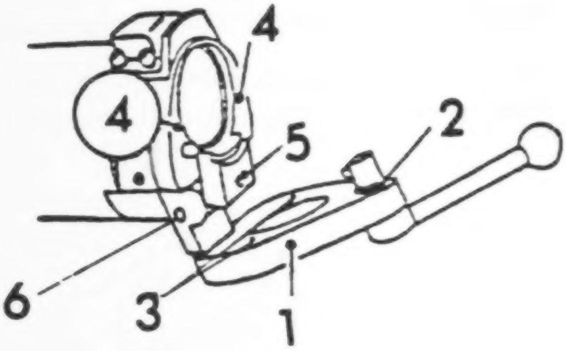
Use CLP (see Item 4, Appendix D) to clean powder from breech door (1), breech lock lever (2), and contacts (3) in breech door.

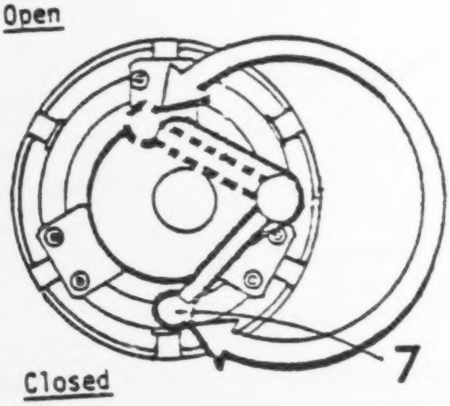
Use CLP to clean powder from terminals (4) in breech block. Also, clean entire breech block.

Use CLP to clean powder from cartridge extractor (5).

Put drop of CLP at breech door hinge and breech lock lever (6).

Close breech door and move lever to closed position (7).





SECTION II. TROUBLESHOOTING

Tables 3-1 and 3-2 list the common malfunctions which you may find during the operation or maintenance of the MILES AH-1S Attack Helicopter or its components. You should perform the Tests/Inspections and Corrective Actions in the order listed.

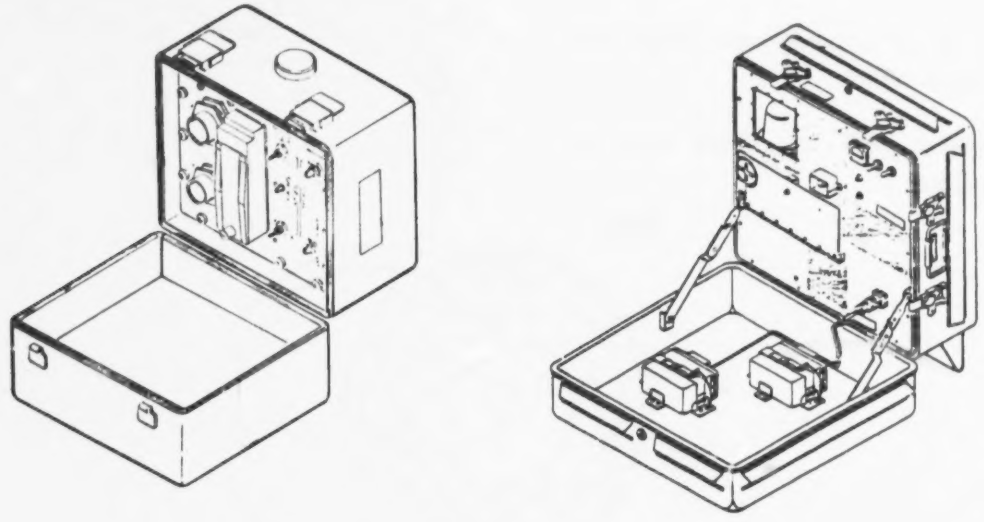
Table 3-1 lists corrective actions by removing and replacing components.

Table 3-2 requires use of troubleshooting test equipment shown in figure 3-1.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your Supervisor.

Troubleshooting procedures in table 3-2 require the assistance of a Controller, a MILES System Test Set (MSTS) (Section II, Appendix C), Laser Alignment Control Assembly (Section II, Appendix C), Multiple Range Alignment Device (Section II, Appendix C), Man Worn Laser Detector Assembly (Section II, Appendix C), and Controller Gun (Section II, Appendix C).

The Controller will provide this equipment and perform troubleshooting procedures. Crew members will assist the Controller. Figure 3-2 is a component connection diagram and should be used as a reference.



LASER ALIGNMENT CONTROL ASSEMBLY

MULTIPLE RANGE ALIGNMENT DEVICE

Figure 3-1. MILES AH-1S Helicopter Troubleshooting Equipment

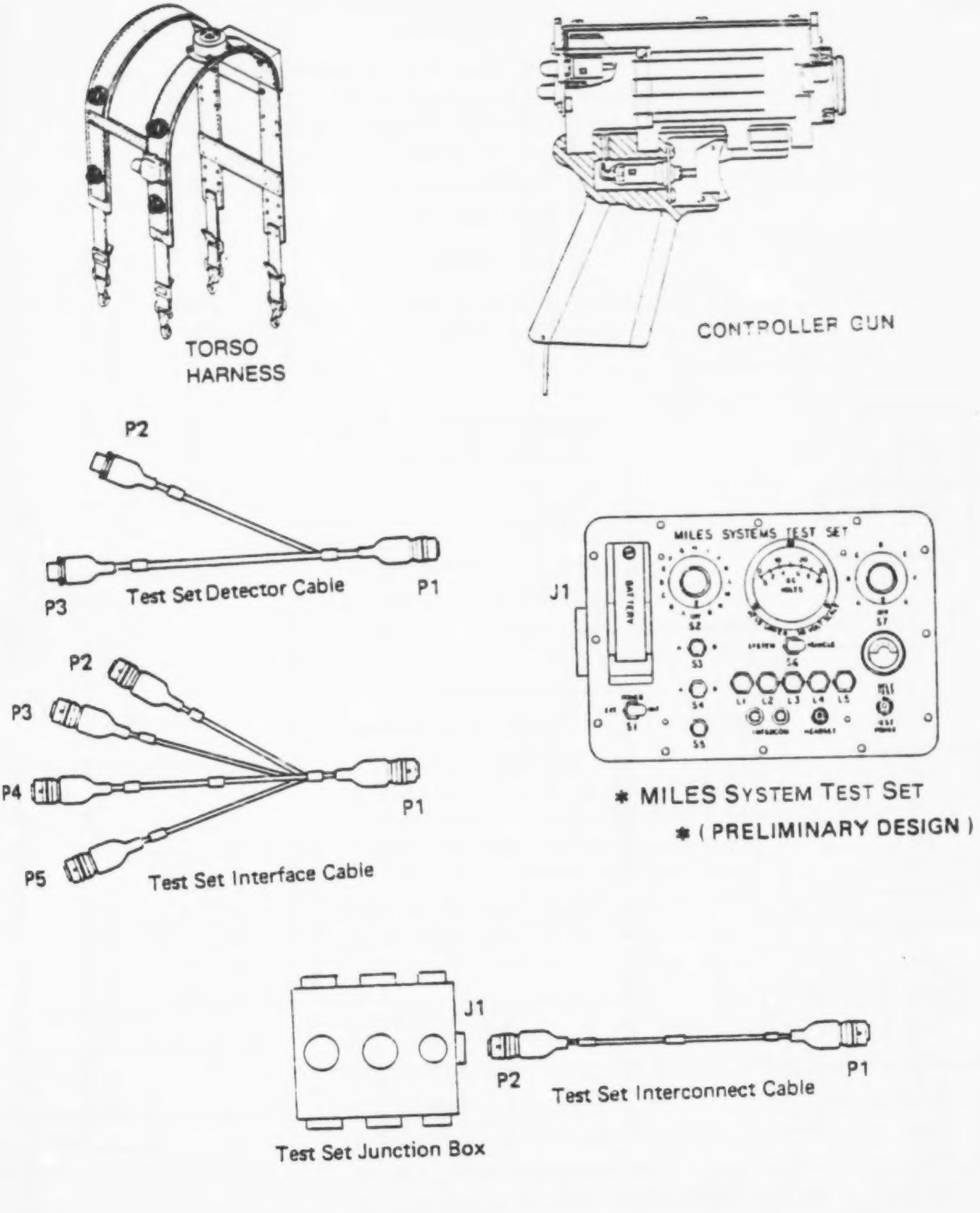

TORSO
HARNESS
CONTROLLER GUN
P2
P3
Test Set Detector Cable
P1
J1
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5
* MILES SYSTEM TEST SET
* (PRELIMINARY DESIGN)
P2
P3
P4
P5
P1
Test Set Interface Cable
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box

Figure 3-1. MILES AH-1S Helicopter Troubleshooting Equipment

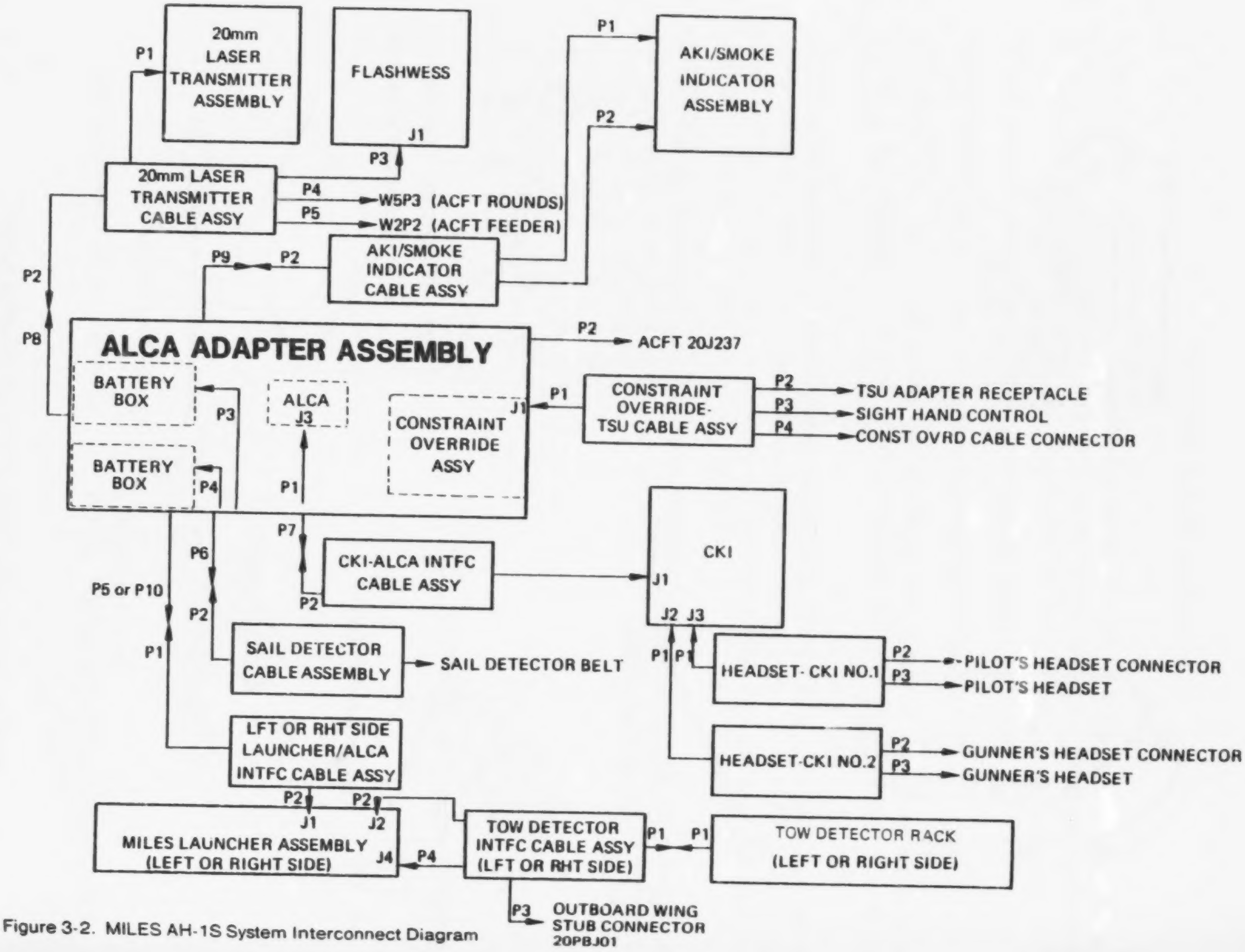

20mm LASER TRANSMITTER ASSEMBLY
FLASHWESS
AKI/SMOKE INDICATOR ASSEMBLY
P1
P2
J1
P3
20mm LASER TRANSMITTER CABLE ASSY
P4
P5
W5P3 (ACFT ROUNDS)
W2P2 (ACFT FEEDER)
P9
AKI/SMOKE INDICATOR CABLE ASSY
P8
ALCA ADAPTER ASSEMBLY
BATTERY BOX
BATTERY BOX
ALCA J3
CONSTRAINT OVERRIDE ASSY
ACFT 20J237
CONSTRAINT OVERRIDE-TSU CABLE ASSY
TSU ADAPTER RECEPTACLE
SIGHT HAND CONTROL
CONST OVRD CABLE CONNECTOR
P7
P6
P5 or P10
CKI-ALCA INTFC CABLE ASSY
CKI
J2 J3
SAIL DETECTOR CABLE ASSEMBLY
SAIL DETECTOR BELT
HEADSET- CKI NO.1
PILOT'S HEADSET CONNECTOR
PILOT'S HEADSET
HEADSET-CKI NO.2
GUNNER'S HEADSET CONNECTOR
GUNNER'S HEADSET
LFT OR RHT SIDE LAUNCHER/ALCA INTFC CABLE ASSY
J2
J4
MILES LAUNCHER ASSEMBLY (LEFT OR RIGHT SIDE)
TOW DETECTOR INTFC CABLE ASSY (LFT OR RHT SIDE)
TOW DETECTOR RACK (LEFT OR RIGHT SIDE)
OUTBOARD WING STUB CONNECTOR 20PBJ01

Figure 3-2. MILES AH-1S System Interconnect Diagram

WARNING

If task requires Vehicle Equipment Power to be turned ON, ensure Vehicle Equipment Power is turned OFF upon completion of task. Failure to comply may result in Personal Injury or Equipment Damage.

NOTE

If no Test Set is available, go to Table 3-1 (below). If a MILES System Test Set (MSTS) is available, go to Table 3-2, page 3-28.

Table 3-1. SYMPTOM INDEX (NO TEST SET)

Unit	Symptom	Troubleshooting Procedure Page
1. Aircraft Loaders Control Assembly (ALCA) Test	(1) Display Is Blank	3-7
	(2) Display Does Not Indicate 88	3-9
	(3) Weapon Identification Code Is Not Displayed	3-9
	(4) NOT READY Lamp Does Not Light	3-9
	(5) Display Indicates 33	3-9
	(6) Incorrect ROUNDS REMAINING Indication	3-10
2. Cockpit Kill Indicator (CKI) Test	(1) Indicator Lamps Do Not Light	3-10
	(2) KILL Lamp Does Not Light When System Is Killed; Smoke Assembly Operates	3-10
	(3) KILL Lamp Does Not Light When System Is Killed; Smoke Assembly Does Not Operate	3-10
	(4) ENGAGE Lamp Does Not Light	3-11
	(5) ENGAGE Lamp Does Not Reset	3-11
	(6) MISSILE TRACK Lamp Does Not Light	3-12
3. Smoke Assembly Test	(1) Smoke Assembly Inoperative	3-13
4. Aircraft Kill Indicator (AKI) Test	(1) AKI Inoperative With Correct CKI Lamp Indication	3-14
	(2) AKI Inoperative With No CKI ENGAGE Lamp Indication	3-15
5. Aircraft Detector Assemblies Test	(1) Sail Detector Belt Fails	3-15
	(2) TOW Detector Rack Fails	3-15
	(3) MILES Rocket Launcher Assembly Detectors Fail	3-16
	(4) TOW Detector Rack and MILES Rocket Launcher Detectors Fail	3-16
	(5) All Detector Assemblies Inoperative	3-17

Table 3-1. SYMPTOM INDEX (Cont) (NO TEST SET)

	Unit	Symptom	Troubleshooting Procedure Page
6.	MILES Rocket Launcher Test (2.75" Rocket Transmitter)	(1) One Or Two Laser Tubes Inoperative	3-17
		(2) All Laser Tubes Inoperative	3-18
		(3) Display Is Blank	3-18
		(4) Incorrect Firing Indicator Or Round Display Indication	3-19
		(5) Incorrect Aircraft RMS Indication	3-19
		(6) 2.75" Weapon Simulator (FLASHWESS)	3-19
		(7) ATWESS Device Inoperative	3-19
7.	20 mm Laser Transmitter Test	(1) Laser Tube Inoperative	3-21
		(2) Display is Blank	3-21
		(3) Transmitter Does Not Trigger	3-21
		(4) Incorrect Round Display Indication	3-22
		(5) Aircraft Round Counter Inoperative	3-22
8.	FLASHWESS Test (20 mm)	(1) FLASHWESS Does Not Operate	3-23
9.	TOW Transmitter Test	(1) ALCA Will Not Trigger	3-24
		(2) Wire Cut Inoperative	3-24
		(3) No Laser Output	3-25
10.	Programmer Control Panel (PCP) Test	(1) PCP Inoperative	3-26
11.	Constraint Override Assembly Test	(1) Constraint Override Assembly Inoperative	3-26
12.	Headset Test	(1) Headsets Faulty	3-27

Table 3-1. Troubleshooting - No Test Set

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

NOTE

The following Troubleshooting procedures are common to all malfunctions listed. These should be performed before attempting procedures listed for each item of AGES/AD equipment.

Disconnect connector(s) from unit being tested. Wait one second and reconnect.

If malfunction is corrected, return system to service.

If unit still malfunctions, disconnect Battery Boxes from ALCA Adapter Assembly, connectors P3 and P4. Wait one second and reconnect.

If malfunction is corrected, return system to service.

If unit still malfunctions, remove batteries from both Battery Boxes. Replace with new batteries.

If malfunction is corrected, return system to service.

If unit still malfunctions, remove Battery Boxes. Replace with Battery Boxes known to be usable. Insert new batteries.

If malfunction is corrected, return system to service.

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) TEST

(1) Display Is Blank

Remove ALCA and replace with ALCA known to be operable. Check display reading.

If display indicates 00, return system to service.

If display is still blank, reinstall former ALCA. Remove CKI. Replace with CKI known to be operable. Check display reading.

If display indicates 00, return system to service.

If display is still blank, reinstall former CKI. Remove CKI-ALCA Interface Cable. Replace with cable assembly known to be usable. Check display reading.

If display indicates 00, return system to service.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) TEST (CONT)

(1) Display Is Blank (Cont)

If display is still blank, reinstall former CKI-ALCA Interface Cable. Remove ALCA Adapter Assembly and replace with adapter assembly known to be operable. Check display reading.

If display indicates 00, return system to service.

If display is still blank, reinstall former ALCA Adapter Assembly. Each of the assemblies and cable assemblies listed below should be removed and replaced, ONE AT A TIME and IN THE ORDER LISTED. Check display reading between each removal and replacement.

a. SAIL DETECTOR BELT
b. SAIL DETECTOR BELT CABLE
c. 20 mm TRANSMITTER
d. 20 mm TRANSMITTER CABLE
e. AKI
f. SMOKE INDICATOR
g. AKI/SMOKE INDICATOR CABLE
h. RIGHT TOW DETECTOR RACK
i. RIGHT MILES LAUNCHER ASSEMBLY
j. RIGHT TOW DETECTOR INTFC CABLE
k. RIGHT LAUNCHER/ALCA INTFC CABLE
l. LEFT TOW DETECTOR RACK

If display indicates 00, during any step of the procedure, return system to service.

If display still does not indicate 00, verify AH-1S Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

(2) Display Does Not Indicate 88

Failure of the ALCA to display 88 indicates a malfunction of the ALCA.

Replace defective ALCA. Return system to service.

(3) Weapon Identification Code is Not Displayed

Failure of the ALCA to display a Weapon identification Code indicates a malfunction of the ALCA.

Replace defective ALCA. Return system to service.

(4) NOT READY Lamp Does Not Light

Failure of the NOT READY lamp to light when a KILL response is indicated by the AKI/SMOKE Assembly, and the CKI indicates a malfunction of the ALCA.

Replace defective ALCA. Return system to service.

(5) Display Indicates 33

Place SYSTEM switch on CKI to OFF. Pause one second and place SYSTEM switch to ON.

Insert a Controller Key into Controller key receptacle on CKI. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Turn ALCA Select switch to HIT/KILL WPN IDENT, then turn to SELF TEST. Check ALCA display.

If display indicates 88, return system to service.

If display indicates 33, remove ALCA. Replace with ALCA known to be operable. Check display reading.

If display indicates 88, return system to service.

If display indicates 33, reinstall former ALCA. Remove CKI. Replace with CKI known to be operable. Check display reading.

If display indicates 88, return system to service.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) TEST (CONT)

(5) Display Indicates 33 (Cont)

If display indicates 33, reinstall former CKI. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Check display reading.

If display indicates 88, return system to service.

If display indicates 33, reinstall former CKI-ALCA INTFC Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(6) Incorrect ROUNDS REMAINING Indication

Failure of the ALCA to display a Missile ROUNDS REMAINING indication of 8 indicates a malfunction of the ALCA.

Replace defective ALCA. Return system to service.

2. COCKPIT KILL INDICATOR (CKI) TEST

(1) Indicator Lamps Do Not Light

Momentarily depress each indicator lamp on CKI.

If any indicator lamp fails to light, replace defective CKI. Return system to service.

(2) KILL Lamp Does Not Light When System Is KILLED; Smoke Assembly Operates

Failure of the KILL lamp to light when Smoke assembly is operating properly indicates a malfunction of the CKI.

Replace defective CKI. Return system to service.

(3) KILL Lamp Does Not Light When System Is KILLED; Smoke Assembly Does Not Operate

Remove CKI. Replace with CKI known to be operable. Check KILL lamp.

If KILL lamp lights, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If KILL lamp does not light, reinstall former CKI. Remove ALCA. Replace with ALCA known to be operable. Check KILL lamp.

If KILL lamp lights, return system to service.

If KILL lamp does not light, reinstall former ALCA. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Check KILL lamp.

If KILL lamp lights, return system to service.

If KILL lamp does not light, reinstall former CKI-ALCA INTFC Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(4) ENGAGE Lamp Does Not Light

Remove CKI. Replace with CKI known to be operable. Check ENGAGE light.

If ENGAGE lamp lights, return system to service.

If ENGAGE lamp does not light, reinstall former CKI. Remove ALCA. Replace with ALCA known to be operable. Check ENGAGE lamp.

If ENGAGE lamp lights, return system to service.

If ENGAGE lamp does not light, reinstall former ALCA. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Check ENGAGE lamp.

If ENGAGE lamp lights, return system to service.

If ENGAGE lamp does not light, reinstall former CKI-ALCA INTFC Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(5) ENGAGE Lamp Does Not Reset

Remove CKI. Replace with CKI known to be operable. Check ENGAGE lamp for reset.

If ENGAGE lamp resets, return system to service.

If ENGAGE lamp does not reset, reinstall former CKI. Remove ALCA. Replace with ALCA known to be operable. Check ENGAGE lamp for reset.

If ENGAGE lamp resets, return system to service.

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Table 3-1. Troubleshooting – No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(5) ENGAGE Lamp Does Not Reset (Cont)

If ENGAGE lamp does not reset, reinstall former ALCA. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Check ENGAGE lamp for reset.

If ENGAGE lamp resets, return system to service.

If ENGAGE lamp does not reset, reinstall former CKI-ALCA INTFC Cable Assembly. Remove AKI. Replace with AKI known to be operable. Check ENGAGE lamp for reset.

If ENGAGE lamp resets, return system to service.

If ENGAGE lamp does not reset, reinstall former AKI. Remove AKI/Smoke Indicator Cable Assembly. Replace with cable assembly known to be usable. Check ENGAGE lamp for reset.

If ENGAGE lamp resets, return system to service.

If ENGAGE lamp does not reset, reinstall former AKI/Smoke Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(6) MISSILE TRACK Lamp Does Not Light

NOTE

If MISSILE TRACK lamp lights momentarily (2 – 3 seconds) when a TOW Missile is fired, refer to Programmer Control Panel Test, page 3-26.

Remove CKI. Replace with CKI known to be operable. Check that MISSILE TRACK lamp lights.

If MISSILE TRACK lamp lights, return system to service.

If MISSILE TRACK lamp does not light, reinstall former CKI. Remove ALCA. Replace with ALCA known to be operable. Check that MISSILE TRACK lamp lights.

If MISSILE TRACK lamp lights, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If MISSILE TRACK lamp does not light, reinstall former ALCA. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Check that MISSILE TRACK lamp lights.

If MISSILE TRACK lamp lights, return system to service.

If MISSILE TRACK lamp does not light, reinstall former CKI-ALCA INTFC Cable Assembly.

Replace ALCA Adapter Assembly. Return system to service.

3. SMOKE ASSEMBLY TEST

(1) Smoke Assembly Inoperative

Check the following:

TSGMS Circuit Breaker (located in battery compartment) in ON position.

ALCA Interface Cable, connector P2, is properly connected to connector 20J237 in Ammunition Bay.

If Smoke Assembly does not operate, remove CKI. Replace with CKI known to be operable. Retest Smoke Assembly.

If Smoke Assembly operates correctly (extractor is pulled into housing), return system to service.

If Smoke Assembly does not operate, reinstall former CKI. Remove Smoke Assembly. Replace with assembly known to be operable. Retest Smoke Assembly.

If Smoke Assembly operates correctly, return system to service.

If Smoke Assembly does not operate, reinstall former Smoke Assembly. Remove CKI-ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest Smoke Assembly.

If Smoke Assembly operates correctly, return system to service.

If Smoke Assembly does not operate, reinstall former CKI-ALCA INTFC Cable Assembly. Remove AKI/Smoke Indicator Cable Assembly. Replace with cable assembly known to be usable. Retest Smoke Assembly.

If Smoke Assembly operates correctly, return system to service.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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3. SMOKE ASSEMBLY TEST (CONT)

(1) Smoke Assembly Inoperative (Cont)

If Smoke Assembly does not operate, reinstall former AKI/Smoke Indicator Cable Assembly. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest Smoke Assembly.

If Smoke Assembly operates correctly, return system to service.

If Smoke Assembly does not operate, reinstall former ALCA Adapter Assembly. Verify AH-1S Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

4. AIRCRAFT KILL INDICATOR (AKI) TEST

(1) AKI Inoperative With Correct CKI Lamp Indication

Check the following:

TSGMS Circuit Breaker (located in battery compartment) in ON position.

ALCA Interface Cable, connector P2, is properly connected to connector 20J237 in Ammunition Bay.

If AKI does not operate, remove AKI. Replace with AKI known to be operable. Retest AKI.

If AKI operates correctly, return system to service.

If AKI does not operate, reinstall former AKI. Remove AKI/Smoke Indicator Cable Assembly. Replace with cable assembly known to be usable. Retest AKI.

If AKI operates correctly, return system to service.

If AKI does not operate, reinstall former AKI/Smoke Indicator Cable Assembly. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest AKI.

If AKI operates correctly, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If AKI does not operate, reinstall former ALCA Adapter Assembly. Verify AH-1S Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

(2) AKI Inoperative With No CKI ENGAGE Lamp Indication

If AKI does not operate and CKI ENGAGE lamp does not light, remove ALCA. Replace with ALCA known to be operable. Retest AKI.

If AKI operates and CKI ENGAGE lamp lights, return system to service.

If AKI does not operate and CKI ENGAGE lamp does not light, reinstall ALCA.

Replace ALCA Adapter Assembly. Return system to service.

5. AIRCRAFT DETECTOR ASSEMBLIES TEST

(1) Sail Detector Belt Fails

If Sail Detector belt fails, remove belt. Replace with belt known to be usable. Retest system.

If detector belt responds correctly, return system to service.

If Sail Detector belt still fails, reinstall former belt assembly. Remove Sail Detector Belt Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If detector belt responds correctly, return system to service.

If Sail Detector belt still fails, reinstall former Sail Detector Belt Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(2) TOW Detector Rack Fails

If TOW Detector Rack fails, remove rack. Replace with rack known to be usable. Retest system.

If detector rack responds correctly, return system to service.

Table 3-1. Troubleshooting – No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(2) TOW Detector Rack Fails (Cont)

If TOW Detector Rack still fails, reinstall former rack. Remove TOW Detector INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If detector rack responds correctly, return system to service.

If TOW Detector Rack still fails, reinstall former TOW Detector INTFC Cable Assembly.

Replace defective MILES Rocket Launcher Assembly. Return system to service.

(3) MILES Rocket Launcher Assembly Detectors Fail

Failure of the MILES Rocket Launcher Assembly Detectors when the adjacent TOW Detector Rack is functional indicates a malfunction of the MILES Rocket Launcher Assembly.

Replace defective launcher assembly. Return system to service.

(4) TOW Detector Rack And MILES Rocket Launcher Detectors Fail

If TOW Detector Rack and MILES Rocket Launcher detectors fail, remove TOW Detector Rack. Replace with rack known to be usable. Retest system.

If detector rack and launcher detectors respond correctly, return system to service.

If detectors still fail, reinstall former TOW Detector Rack. Remove TOW Detector INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If detector rack and launcher detectors respond correctly, return system to service.

If detectors still fail, reinstall former TOW Detector INTFC Cable Assembly. Remove MILES Rocket Launcher Assembly. Replace with launcher assembly known to be operable. Retest system.

If detector rack and launcher detectors respond correctly, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If detectors still fail, reinstall former MILES Rocket Launcher Assembly. Remove Launcher/ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If detector rack and launcher detectors respond correctly, return system to service.

If detectors still fail, reinstall former Launcher/ALCA INTFC Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(5) All Detector Assemblies Inoperative

If all detector assemblies fail, each of the assemblies and cable assemblies listed below should be removed and replaced.

Each removal/replacement should be done ONE AT A TIME and IN THE ORDER LISTED. Retest system between each removal and replacement.

a. SAIL DETECTOR BELT

b. SAIL DETECTOR BELT CABLE ASSEMBLY

Do c. through f. for both sides.

c. TOW DETECTOR RACK

d. TOW DETECTOR INTFC CABLE ASSEMBLY

e. ROCKET LAUNCHER ASSEMBLY

f. LAUNCHER/ALCA INTFC CABLE ASSEMBLY

g. ALCA

h. ALCA ADAPTER ASSEMBLY

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER)

(1) One Or Two Laser Tubes Inoperative

One or two Laser Tubes inoperative indicates a malfunction of the 2.75" Transmitter Assembly.

Replace defective MILES Rocket Launcher. Return system to service.

Table 3-1. Troubleshooting – No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER) (CONT)

(2) All Laser Tubes Inoperative

Remove TTI from MILES Rocket Launcher Assembly. Replace with TTI known to be operable. Retest transmitter.

If transmitter operates, return system to service.

If transmitter does not operate, reinstall former TTI. Remove MILES Rocket Launcher Assembly. Replace with launcher assembly known to be operable. Retest transmitter.

If transmitter operates, return system to service.

If transmitter does not operate, reinstall former MILES Rocket Launcher Assembly. Verify AH-1S Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct malfunction (refer to TM 55-1520-234-10). Return system to service.

(3) Display Is Blank

Insert Controller Key into CONTROLLER key receptacle on TTI. Turn to RESET position. Turn back and remove key. Check launcher display.

If launcher display indicates 19, return system to service.

If display does not indicate 19, place CKI SYSTEM switch to OFF. Pause one second and place to ON.

Insert Controller Key into CONTROLLER key receptacle on TTI. Turn to RESET position. Check launcher display.

If launcher display indicates 19, return system to service.

If display does not indicate 19, remove Launcher/ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If launcher display indicates 19, return system to service.

If display does not indicate 19, reinstall Launcher/ALCA INTFC Cable Assembly. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest system.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If launcher display indicates 19, return system to service.

If display does not indicate 19, reinstall Launcher/ALCA INTFC Cable Assembly.

Replace defective MILES Rocket Launcher Assembly. Return system to service.

(4) Incorrect Firing Indicator Or Round Display Indication

Any of the following indicates a malfunction of the 2.75" Laser Transmitter Assembly:

a. ROUNDS REMAINING display does not DECREASE when the transmitter is triggered.

b. ROUNDS REMAINING display does not display 19 after reset.

c. ROUNDS REMAINING display is not blank when transmitter is firing.

d. Firing Indicators (decimal points on display) do not light when transmitter is firing.

e. Firing Indicators are ON for less than 5 seconds when a single rocket is fired.

Replace defective MILES Rocket Launcher Assembly. Return system to service.

(5) Incorrect Aircraft RMS Indication

Turn aircraft MASTER ARM switch to OFF.

Verify aircraft Wing Stored Circuit Breakers are ON.

Momentarily depress Rocket WESS pushbutton on TTI. Check FLASHWESS.

If FLASHWESS operates, return system to service.

If FLASHWESS fails, replace defective MILES Rocket Launcher Assembly. Return system to service.

(6) 2.75" Weapon Simulator (FLASHWESS)

Same procedure as 6, (5) Incorrect Aircraft RMS Indication.

(7) ATWESS Device Inoperative

NOTE

A disconnected MILES PCP assembly will prevent all ATWESS devices from firing when the ALCA and the CKI Missile Track light indicate a TOW firing.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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6. ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER) (CONT)

(7) ATWESS Device Inoperative (Cont)

Remove ATWESS cartridge. Rotate 90 degrees. Reinstall ATWESS cartridge. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate correctly, check the cartridge primer.

If primer is dented, ATWESS cartridge is a dud. Dispose of in accordance with local EOD procedures.

Replace ATWESS cartridge. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate, remove TOW Missile/Launcher Cable from opposite side of aircraft. Install cable on suspect failing side. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate, reinstall former TOW Missile/Launcher Cable. Remove Launcher/ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate, reinstall former Launcher/ALCA INTFC Cable Assembly. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate, reinstall former ALCA Adapter Assembly. Remove MILES Rocket Launcher Assembly. Replace with launcher assembly known to be operable. Retest system.

If ATWESS device operates correctly, return system to service.

If ATWESS device does not operate, reinstall former MILES Rocket Launcher Assembly. Verify TOW Weapon System is operational.

ALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

7. 20 MM LASER TRANSMITTER TEST

(1) Laser Tube Inoperative

An inoperative Laser Tube when Firing indicators are lit indicates a malfunction of the transmitter.

Replace defective transmitter. Return system to service.

(2) Display Is Blank

If display is blank, remove 20 mm Laser Transmitter. Replace with transmitter assembly known to be operable. Reset transmitter.

If CKI display indicates 75, return system to service.

If display is blank, reinstall former 20 mm Laser Transmitter. Remove 20 mm Laser Transmitter Cable Assembly. Replace with cable assembly known to be usable. Reset transmitter.

If CKI display indicates 75, return system to service.

If display is blank, reinstall former 20 mm Laser Transmitter Cable Assembly.

Replace defective ALCA Adapter Assembly. Return system to service.

(3) Transmitter Does Not Trigger

WARNING

Keep personnel clear of gun barrel. Moving gun may cause injury to personnel.

Table 3-1. Troubleshooting – No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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7. 20 MM LASER TRANSMITTER TEST (CONT)

(3) Transmitter Does Not Trigger (Cont)

If transmitter does not trigger, remove 20 mm Laser Transmitter. Replace with transmitter assembly known to be operable. Retest system.

If transmitter triggers, return system to service.

If transmitter does not trigger, reinstall former 20 mm Laser Transmitter. Remove 20 mm Laser Transmitter Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If transmitter triggers, return system to service.

If transmitter does not trigger, reinstall former 20 mm Laser Transmitter Cable Assembly. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest system.

If transmitter triggers, return system to service.

If transmitter does not trigger, reinstall former ALCA Adapter Assembly. Verify aircraft 20 mm Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

(4) Incorrect Round Display Indication

An incorrect Round Display indicates a malfunction of the 20 mm Laser Transmitter.

Replace defective transmitter. Return system to service.

(5) Aircraft Round Counter Inoperative

Reset 20 mm Laser Transmitter.

Momentarily depress PUSH TO TEST switch on transmitter. Retest system.

If Round Counter operates correctly, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If Round Counter does not operate, remove 20 mm Laser Transmitter. Replace with transmitter known to be operable. Retest system.

If Round Counter operates correctly, return system to service.

If Round Counter does not operate, reinstall former 20 mm Laser Transmitter. Remove 20 mm Laser Transmitter Cable Assembly. Replace with cable assembly known to be usable.

If Round Counter operates correctly, return system to service.

If Round Counter does not operate, reinstall former 20 mm Laser Transmitter Cable Assembly. Verify aircraft 20 mm Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

8. FLASHWESS TEST

(1) FLASHWESS Does Not Operate

If FLASHWESS does not operate, remove FLASHWESS. Replace with FLASHWESS known to be operable. Retest system.

If FLASHWESS operates correctly, return system to service.

If FLASHWESS does not operate, reinstall former FLASHWESS. Remove 20 mm Laser Transmitter Cable Assembly. Replace with cable assembly known to be usable.

If FLASHWESS operates correctly, return system to service.

If FLASHWESS does not operate, reinstall former 20 mm Laser Transmitter Cable Assembly. Remove 20 mm Laser Transmitter. Replace with transmitter known to be operable. Retest system.

If FLASHWESS operates correctly, return system to service.

If FLASHWESS does not operate, reinstall former 20 mm Laser Transmitter.

Replace ALCA Adapter Assembly. Return system to service.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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9. TOW TRANSMITTER TEST

(1) ALCA Will Not Trigger

Remove ALCA. Replace with ALCA known to be operable. Retest system.

If ALCA triggers, return system to service.

If ALCA does not trigger, reinstall former ALCA. Remove TOW Missile/Launcher Cable from suspected malfunctioning side of aircraft. Replace with identical cable from opposite side of aircraft. Retest system.

If ALCA triggers, replace suspect cable. Return system to service.

If ALCA does not trigger, reinstall former TOW Missile/Launcher Cable. Remove ALCA Adapter Assembly. Replace with adapter assembly known to be operable. Retest system.

If ALCA triggers, return system to service.

If ALCA does not trigger, reinstall former ALCA Adapter Assembly. Remove Launcher/ALCA INTFC Cable Assembly. Replace with cable assembly known to be usable. Retest system.

If ALCA triggers, return system to service.

If ALCA does not trigger, reinstall former Launcher/ALCA Cable Assembly. Remove MILES Rocket Launcher Assembly. Replace with launcher assembly known to be operable. Retest system.

If ALCA triggers, return system to service.

If ALCA does not trigger, reinstall former MILES Rocket Launcher Assembly. Verify TOW Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

(2) Wire Cut Inoperative

Remove ALCA. Replace with ALCA known to be operational. Retest system.

If Wire Cut is operative, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If Wire Cut is inoperative, reinstall ALCA. Remove Launcher AFT TOW INTFC cable from suspected malfunctioning side of aircraft. Replace with identical cable from opposite side of aircraft. Retest system.

If Wire Cut is operative, replace suspect cable. Return system to service.

If Wire Cut is inoperative, reinstall former Launcher AFT TWO INTFC Cable. Remove ALCA Adapter Assembly. Replace with assembly known to be operable. Retest system.

If Wire Cut operates, return system to service.

If Wire Cut is inoperative, reinstall former ALCA Adapter Assembly. Remove Launcher/ALCA INTFC Cable Assembly. Replace with a cable assembly known to be usable. Retest system.

If Wire Cut operates, return system to service.

If Wire Cut is inoperative, reinstall former Launcher/ALCA INTFC Cable Assembly. Remove Rocket Launcher Assembly. Replace with an assembly known to be operable. Retest system.

If Wire Cut operates, return system to service.

If Wire Cut is inoperative, reinstall former Rocket Launcher Assembly. Verify TOW Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

(3) No Laser Output

NOTE

The LOAD SELECT switches on TSU Alignment Control Unit and Constraint Override Assembly must be set to the same position, L or H..

Remove ALCA. Replace with ALCA known to be operational. Retest system.

If TOW laser operates, return system to service.

Table 3-1. Troubleshooting - No Test Set (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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9. TOW TRANSMITTER TEST (CONT)

(3) No Laser Output (Cont)

If TOW laser is inoperative, reinstall former ALCA. Remove ALCA Adapter Assembly. Replace with assembly known to be operable. Retest system.

If TOW laser operates, return system to service.

If TOW laser is inoperative, reinstall former ALCA Adapter Assembly. Remove Constraint Override Cable Assembly. Replace with a cable assembly known to be usable. Retest system.

If TOW laser operates, return system to service.

If TOW laser is inoperative, reinstall former Constraint Override Cable Assembly. Verify TOW Weapon System is operational.

If weapon system is operational, return system to service.

If weapon system is not operational, correct weapon system malfunction (refer to TM 55-1520-234-10). Return system to service.

10. PROGRAMMER CONTROL PANEL (PCP) TEST

(1) PCP Inoperative

MISSILE TRACK lamp on CKI and NOT READY lamp on ALCA resetting 2 to 3 seconds after TOW Missile firing or multiple TOW Missile firings occurring every 2 to 3 seconds with one trigger actuation, indicates a malfunction of the PCP.

Replace defective PCP. Return system to service.

11. CONSTRAINT OVERRIDE ASSEMBLY TEST

(1) Constraint Override Assembly Inoperative

Remove Constraint Override-TSU Cable Assembly. Replace with a cable assembly known to be usable. Retest system.

If assembly operates correctly, return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If Constraint Override Assembly is inoperative, reinstall former Constraint Override-TSU Cable Assembly. Remove ALCA Adapter Assembly. Replace with an assembly known to be operable. Retest system.

If assembly operates correctly, return system to service.

If Constraint Override Assembly is inoperative, reinstall former ALCA Adapter Assembly. Verify TOW Missile System is oeprational.

If missile system is operational, return system to service.

If missile system is not operational, correct missile system malfunction. Return system to service.

12. HEADSET TEST

(1) Headsets Faulty

Remove CKI. Replace with CKI known to be operational. Retest system.

If audio tone is heard in headsets, return system to service.

If no tone is heard, reinstall former CKI. Remove ALCA. Replace with ALCA known to be operable. Retest system.

If audio tone is heard in headsets, return system to service.

If no tone is heard, reinstall former ALCA. Remove CKI-ALCA INTFC Cable Assembly. Replace with a cable assembly known to be usable. Retest system.

If audio tone is heard in headsets, return system to service.

If no tone is heard, reinstall former CKI-ALCA Cable Assembly. Remove Headset-CKI Cable Assembly. Replace with a cable assembly known to be usable. Retest system.

If audio tone is heard in headsets, return system to service.

If no tone is heard, reinstall former Headset-CKI Cable Assembly.

Replace aircraft headsets. Return system to service.

Table 3-2. SYMPTOM INDEX
(MILES SYSTEM TEST SET)

Unit	Symptom	Troubleshooting Procedure Page
1. Aircraft Loaders Control Assembly (ALCA) Test	(1) Display Is Blank	3-30
	(2) Display Does Not Indicate 88	3-36
	(3) Weapon Identification Code Is Not Displayed	3-37
	(4) NOT READY Lamp Does Not Light	3-38
	(5) Display Indicates 33	3-38
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2. Cockpit Kill Indicator (CKI) Test	(1) Indicator Lamps Do Not Light	3-42
	(2) KILL Lamp Does Not Light When System Is Killed; Smoke Assembly Operates	3-42
	(3) KILL Lamp Does Not Light When System Is Killed; Smoke Assembly Does Not Operate	3-43
	(4) ENGAGE Lamp Does Not Light	3-46
	(5) ENGAGE Lamp Does Not Reset	3-49
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3. Smoke Assembly Test	(1) Smoke Assembly Inoperative	3-57
4. Aircraft Kill Indicator (AKI) Test	(1) AKI inoperative With Correct CKI Lamp Indication	3-62
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5. Aircraft Detector Assemblies Test	(1) Sail Detector Belt Fails	3-68
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6. MILES Rocket Launcher Test (2.75" Rocket Transmitter)	(1) One Or Two Laser Tubes Inoperative	3-81
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Unit	Symptom	Troubleshooting Procedure Page
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9. TOW Transmitter Test	(1) ALCA Will Not Trigger	3-99
	(2) Wire Cut Inoperative	3-105
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10. Programmer Control Panel (PCP) Test	(1) PCP Inoperative	3-114
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12. Headset Test	(1) Headsets Faulty	3-116

Table 3-2. Troubleshooting - With MSTS

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA)

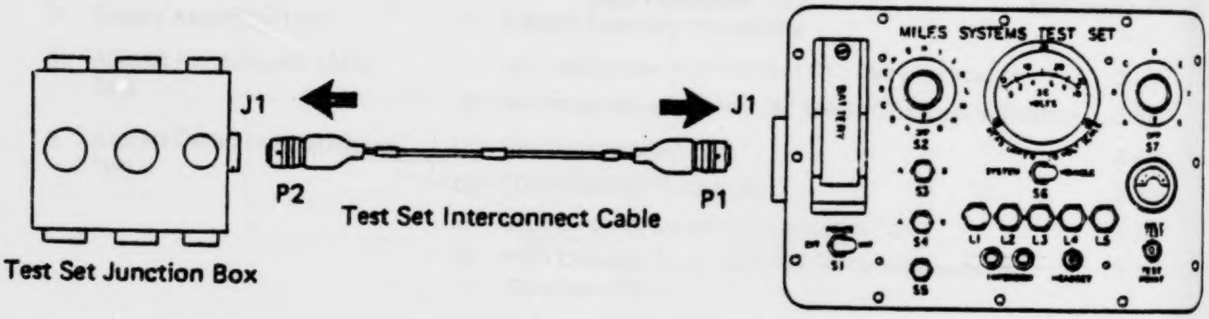
(1) Display Is Blank

Place SYSTEM switch on CKI to OFF. Pause one (1) second and place SYSTEM switch to ON. Check ALCA display.

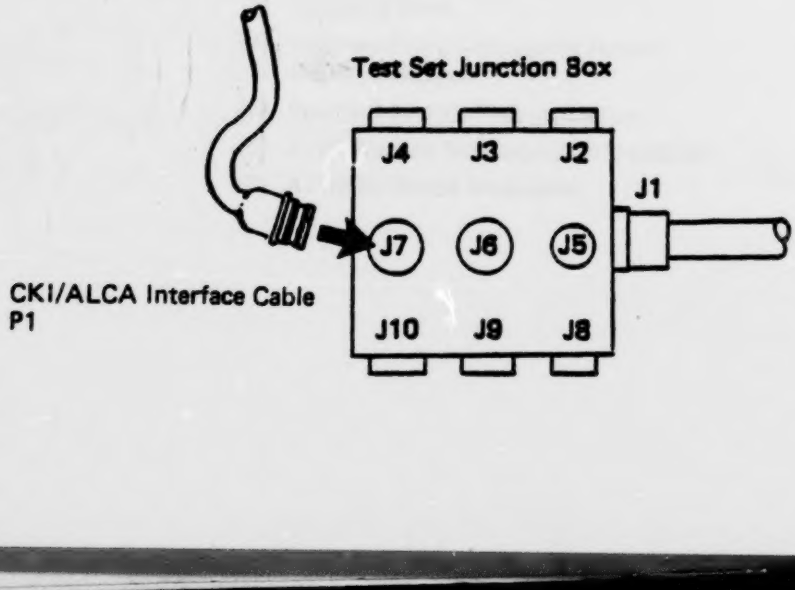
If display indicates 00, return system to service.

If display is still blank, disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect it to connector J7 on Test Set Junction Box.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
VOLTS
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.


Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
CKI/ALCA Interface Cable
P1

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

On test set, place switch S6 to SYSTEM position.

Read voltage on voltmeter.

If voltage reading less than 8.5 volts, proceed to (1A) Display Is Blank - Incorrect Voltage.

If voltage reading is 8.5 to 13 volts, place test set switch S2 to position 0. (Note that test set indicator lights L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Check ALCA display.

If display indicates 00, replace defective CKI and return system to service.

If display is still blank, disconnect CKI Cable from Test Set Junction Box. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connnector P2 (Yellow), from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.

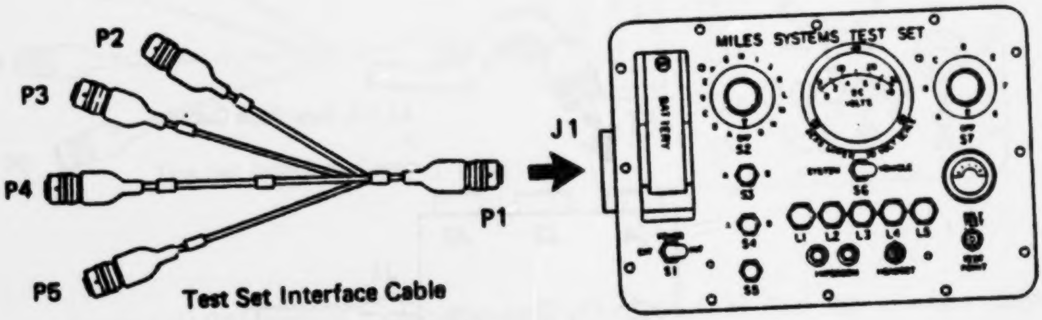

P2
P3
P4
P5
P1
J1
Test Set Interface Cable
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(1) Display Is Blank (Cont)

Connect ALCA Interface Cable, connector P7 (Yellow) to Test Set Interface Cable, connector P2.

Place test set switch S2 to position 0. (Note that test set indicator lights L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Check ALCA display.

If display indicates 00, replace defective CKI-ALCA Interface Cable and return system to service.

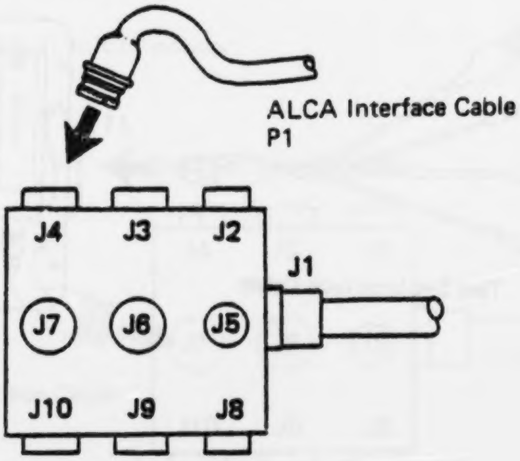
If display is still blank, disconnect ALCA Interface Cable from Test Set Interface Cable. Reconnect it to ALCA Interface Cable.

Disconnect Test Set Interface Cable from test set.

Reconnect Test Set Interconnect Cable to test set.

Disconnect ALCA Interface Cable, connnector P1 (Yellow), connect it to connector J4 on Test Set Junction Box.

On Test Set place test set switch S2 to OFF.



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Verify SYSTEM switch on the CKI is ON.

Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective ALCA and return system to service.

If voltage reading is less than 8.5 volts, proceed to (1B) Display Is Blank – Belt/Cable Test.

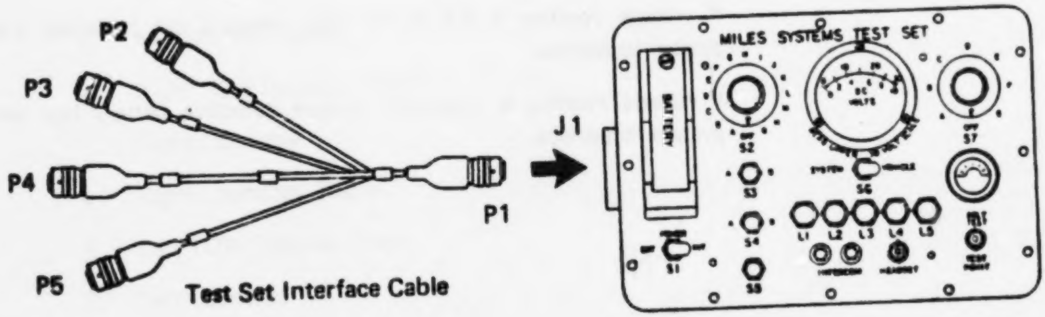
(1A) Display Is Blank – Incorrect Voltage

Disconnect CKI-ALCA Interface Cable from Test Set Junction Box. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connector P2 (Yellow), from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.


P2
P3
P4
P5
P1
J1
Test Set Interface Cable
MILES SYSTEMS TEST SET
BATTERY
OFF
S2
DC
VOLTS
S3
SYSTEM
VEHICLE
S6
OFF
S7
S4
S1
S5
L1
L2
L3
L4
L5
INTERCOM
HEADSET

Connect ALCA Interface Cable, connector P7 (Yellow), to Test Set Interface Cable, connector P2.

Read voltage on test set voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective CKI-ALCA Interface Cable and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(1A) Display Is Blank - Incorrect Voltage (Cont)

If voltage reading is less than 8.5 volts, disconnect ALCA Interface Cable from Test Set Interface Cable.

Reconnect it to CKI-ALCA Interface Cable.

Disconnect battery boxes from ALCA Interface Cable. Connect battery boxes, one at a time, to Test Set Interface Cable, connector P4.

Place test set switch S6 to the SYSTEM position.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective ALCA Adapter Assembly and return system to service.

If voltage reading is less than 8.5 volts, install two (2) new 6 V batteries in battery box.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, discard old batteries and return system to service.

If voltage reading is incorrect, replace defective battery box and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

(1B) Display Is Blank – Belt/Cable Test

Disconnect the following cables and assemblies one at a time in the order shown while reading voltage on the voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective assembly that was disconnected just before voltage check and return system to service.

If voltage reading remains less than 8.5 volts following test of each cable and cable assembly, replace ALCA Adapter Assembly and return system to service.

a. Sail Belt

b. Sail Detector Belt Cable

c. 20 mm Transmitter

d. 20 mm Transmitter Cable

e. AKI

f. SMOKE

g. AKI/SMOKE Cable

h. Right TOW Detector Rack

i. Right Launcher

j. Right Launcher Cable

k. Left TOW Detector Rack

l. Left Launcher

m. Left Launcher Cable

n. Constraint Override–TSU Cable

o. Constraint Override Assembly

p. Constraint Override Cable

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(2) Display Does Not Indicate 88

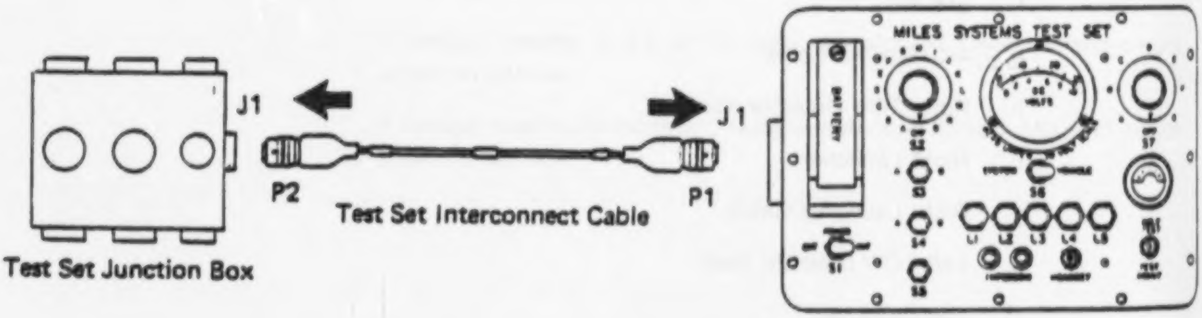
Place SYSTEM switch on CKI to OFF. Pause one (1) second and place system switch to ON.

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Turn console switch on ALCA to HIT/KILL. Then turn to SELF TEST. Check ALCA display.

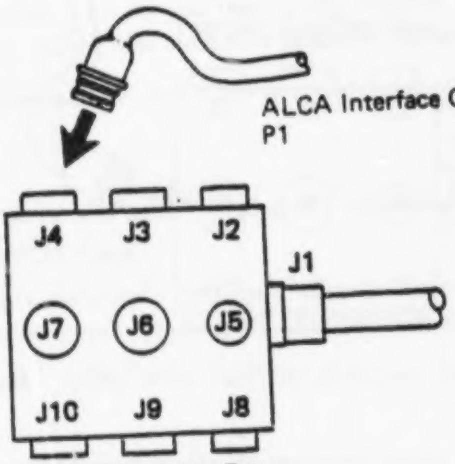
If display indicates 88, return system to service.

If display does not indicate 88, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA. Connect it to connector J4 on Test Set Junction Box.



Test Set Junction Box

Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter

If voltage reading is 8.5 to 13 volts, replace defective ALCA and return system to service.

If voltage reading is less than 8.5 volts, discard old batteries. Install two (2) new 6 V batteries and return system to service.

(3) Weapon Identification Code Is Not Displayed

Failure of ALCA to display a Weapon Identification Code indicates a problem with ALCA.

Replace defective ALCA and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(4) NOT READY Lamp Does Not Light

Failure of NOT READY light to light when a KILL response is being given by AKI, CKI and Smoke Assembly indicates a problem with ALCA.

Replace defective ALCA and return system to service.

(5) Display Indicates 33

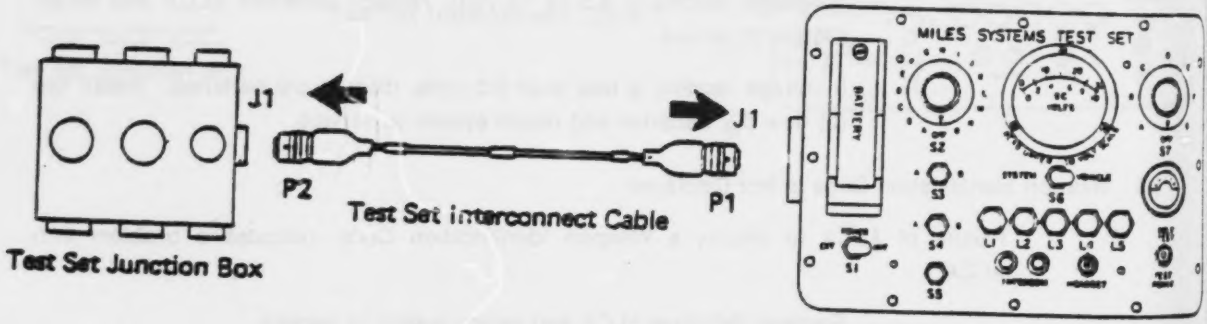
Place SYSTEM switch on CKI to OFF. Pause one (1) second and place SYSTEM switch to ON.

Insert a Controller (Green) Key into Controller key receptacle on CKI. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Turn ALCA select switch to HIT/KILL WPN IDENT, then turn to SELF TEST. Check ALCA display.

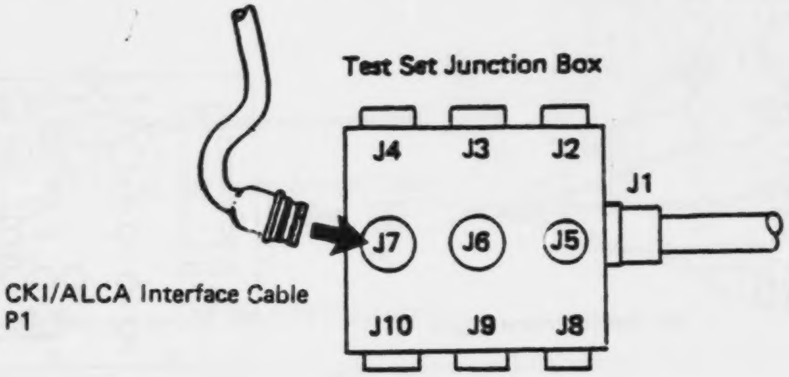
If display indicates 88, return system to service.

If display does not indicate 88, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
DC
VOLTS
OFF
S1
S2
S3
S4
S5
SYSTEM
VEHICLE
S6
S7
L1
L2
L3
L4
L5

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect CKI-ALCA Interface Cable, connector P1 (Yellow), from CKI. Connect it to connector J7 on Test Set Junction Box.



Place test set switch S1 to EXT position.

Place switch S2 to position 0. (Note that test set indicator lights L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key. Turn ALCA switch to HIT/KILL, then to SELF TEST. Check ALCA display.

If display indicates 88, replace defective CKI and return system to service.

If display does not indicate 88, disconnect CKI-ALCA Interface Cable, connector P2, from ALCA Interface Cable, connector P7 (Yellow).

Reconnect it to CKI.

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to the test set, connector J1.

Table 3-2. Troubleshooting - With MSTS (Cont)

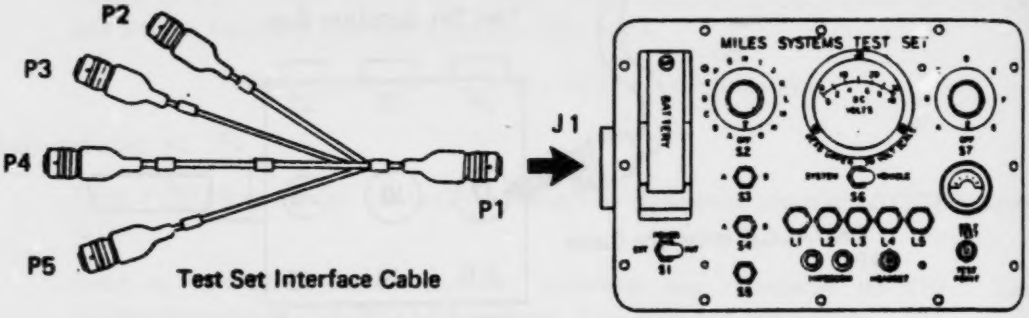
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(5) Display Indicates 33 (Cont)



Connect ALCA Interface Cable, connector P7, to Test Set Interface Cable, connector P2 (Yellow).

Indicators L2 and L4 may light but have no effect on troubleshooting procedures.

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key. Turn ALCA switch to HIT/KILL, then to SELF TEST. Check ALCA display.

If display indicates 88, replace defective CKI cable and return system to service.

If display does not indicate 88, check test set indicator lamp L4.

If lamp L4 is ON, replace defective ALCA and return system to service.

If lamp L4 is not ON, disconnect ALCA Interface Cable from Test Set Interface Cable.

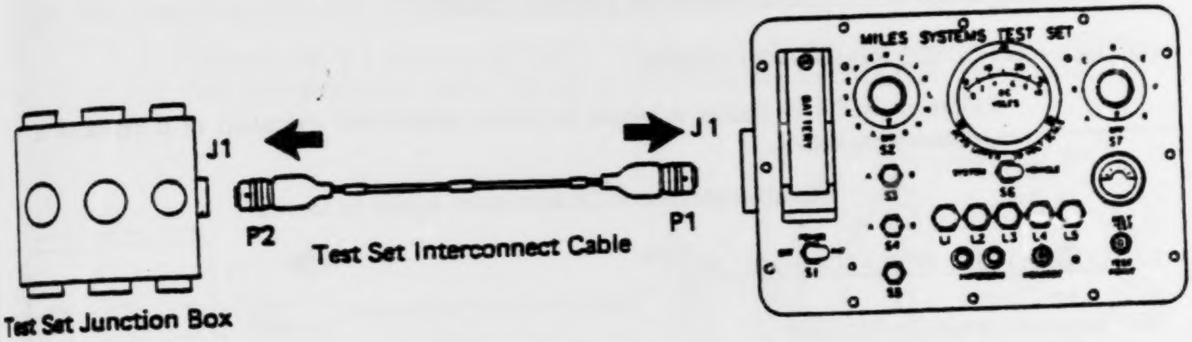
Disconnect Test Set Interface Cable from test set.

Connect ALCA Interface Cable, connector P7 (Yellow), to Test Set Interconnect Cable, connector P2. Connect Test Set Interconnect Cable, connector P1, to Test Set, connector J1.

MALFUNCTION

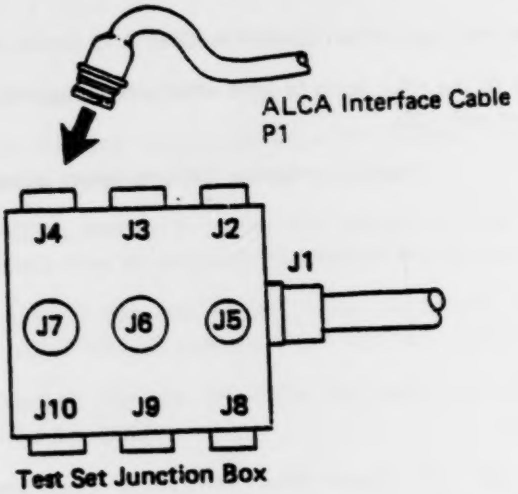
TEST OR INSPECTION

CORRECTIVE ACTION


J1
J1
P2
Test Set Interconnect Cable
P1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S2 to OFF position.

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA. Connect it to connector J4 on Test Set Junction Box.


ALCA Interface Cable
P1
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
Test Set Junction Box

Place test set switch S7 to position B. Depress switch S5. Verify indicator lamp L5 is ON.

If indication is correct, replace defective ALCA and return system to service.

If indicator L5 is not ON, replace defective ALCA Adapter Assembly and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. AIRCRAFT LOADERS CONTROL ASSEMBLY (ALCA) (CONT)

(6) Incorrect ROUNDS REMAINING Indication

Failure of ALCA to display a Missile ROUNDS REMAINING indication of 8 indicates a problem with ALCA.

Replace defective ALCA and return system to service.

2. COCKPIT KILL INDICATOR (CKI) TEST

(1) Indicator Lamps Do Not Light

Momentarily depress each indicator lamp on CKI.

If any indicator lamps do not light, replace defective CKI and return system to service.

(2) KILL Lamp Does Not Light When System Is Killed And Smoke Assembly Operates

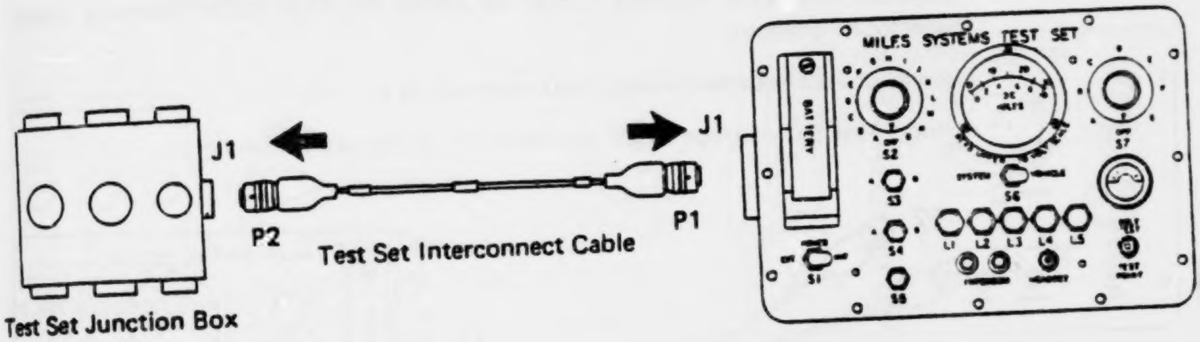
Failure of the KILL lamp to light when smoke assembly is properly operating indicates a problem with CKI.

Replace defective CKI and return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(3) KILL Lamp Does Not Light When System Is Killed And Smoke Assembly Does Not Operate

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Place test set switch S1 to EXT position.

Disconnect CKI-ALCA Interface Cable, connector P1 (Yellow), from CKI. Connect to connector J7 on Test Set Junction Box.

Place test set switch S2 to position 0. (Note that test set indicator light L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Insert a Vehicle (Orange) Key into WEAPON key receptable on ALCA. Turn key clockwise to SELF KILL the system.

(Note test set indicator lamp L2 may flash continuously ON-OFF and test set indicator light L3 may be ON. These indications have no effect on troubleshooting procedures.)

Check test set indicator lamp L1.

If lamp L1 is ON, replace defective CKI and return system to service.

If lamp L1 is not ON, disconnect CKI-ALCA Interface Cable from test set. Reconnect it to CKI.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

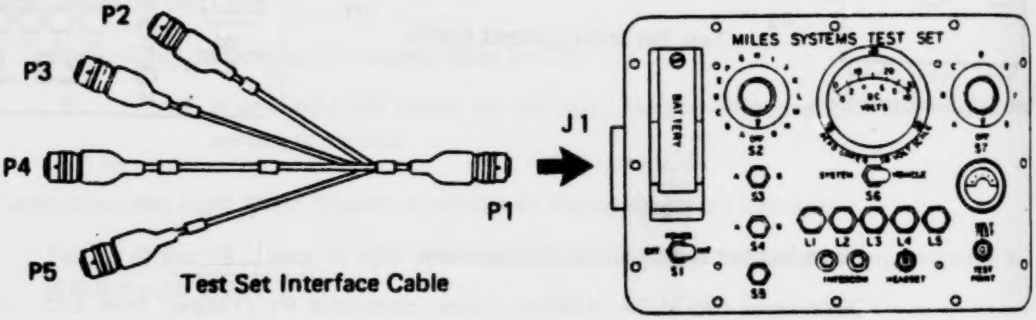
2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(3) KILL Lamp Does Not Light When System Is Killed And Smoke Assembly Does Not Operate (Cont)

Disconnect CKI-ALCA Interface Cable, connector P2, from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test box.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.


P2
P3
P4
P5
P1
Test Set Interface Cable
J1
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
INTERCOM
HEADSET
TEST POINT

Connect ALCA Interface Cable, connector P7 (Yellow), to Test Set Interface Cable, connector P2.

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Insert a Vehicle (Orange) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to SELF KILL the system.

(Note test set indicator lamp L2 may flash continuously ON–OFF and test set indicator light L3 may be ON. These indications have no effect on troubleshooting procedures.)

Reset with green and orange keys.

Check status of test set indicator light L1.

If light L1 is ON, replace defective CKI cable and return system to service.

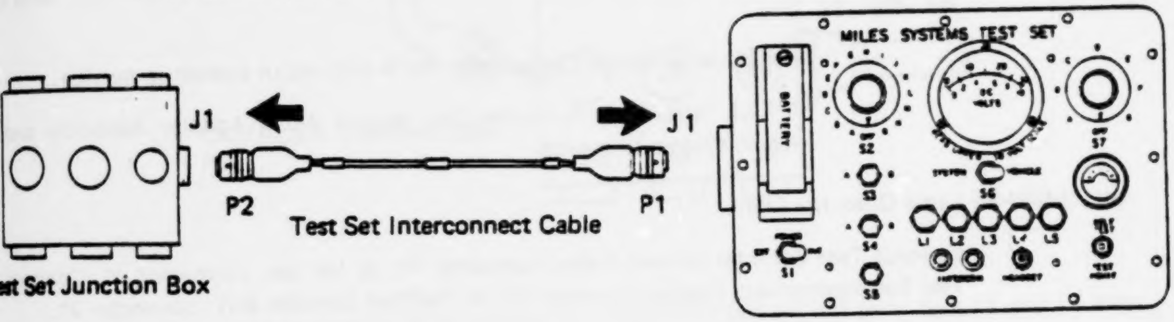
If light L1 is not ON, disconnect ALCA Interface Cable from Test Set Interface Cable.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Reconnect it to CKI-ALCA Interface Cable.

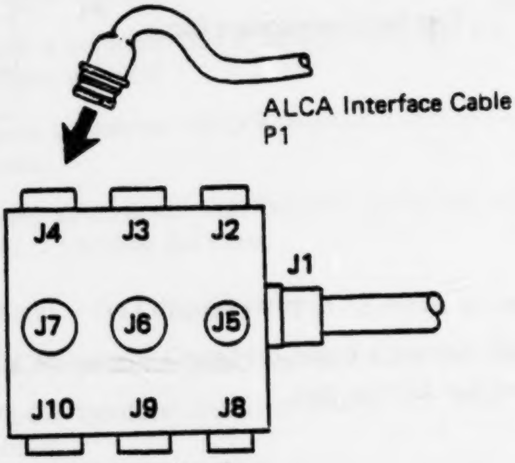
Disconnect Test Set Interface Cable from test set.

Reconnect Test Set Interconnect Cable, connector P1, to test set, connector J1.


J1
J1
P2
P1
Test Set Interconnect Cable
est Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S2 to OFF position.

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA. Connect it to connector J4 on Test Set Junction Box.


ALCA Interface Cable
P1
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8

Test Set Junction Box

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(3) KILL Lamp Does Not Light When System Is Killed And Smoke Assembly Does Not Operate (Cont)

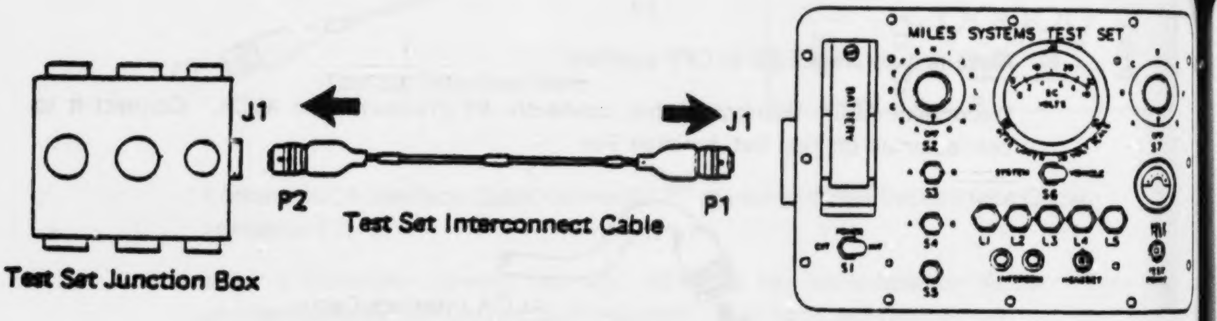
Place test set switch S7 to position F. Depress test set switch S5. Check KILL lamp on the CKI.

If KILL lamp comes ON, replace ALCA and return system to service.

If KILL lamp does not come ON, replace ALCA Adapter Assembly and return system to service.

(4) ENGAGE Lamp Does Not Light

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
J1
P2
Test Set Interconnect Cable
P1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S2
S3
S4
S5
S1
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
INTERCOM
HEADSET
TEST POINT

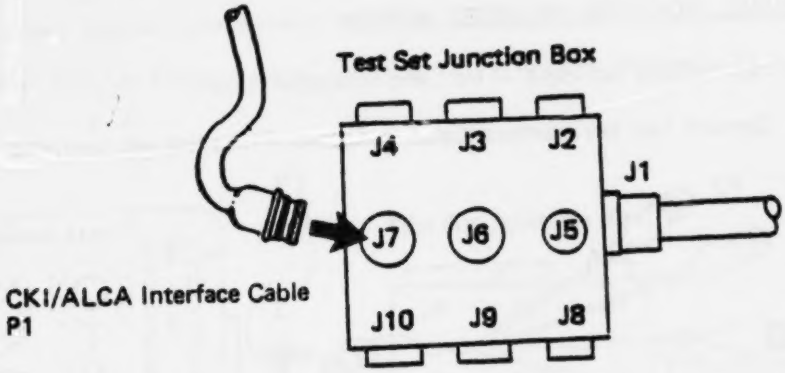
Place test set switch S1 to EXT position.

Disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect it to connector J7 on Test Set Junction Box.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION



Place test set switch S2 to position 0. (Note that test set indicator light L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptable on ALCA. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Check test set indicator lamp L2.

If lamp L2 is not ON, proceed to (4A) ENGAGE Lamp Does Not Light – No Lamp Indication.

If lamp L2 is ON, aim a Controller Gun at detector belts and fire a "NEAR MISS" signal. Check test set indicator lamp L2.

If lamp L2 flashes ON/OFF, replace defective CKI and return system to service.

If lamp L2 does not flash ON/OFF, go to (4B) ENGAGE Lamp Does Not Light – L2 Does Not Flash.

(4A) ENGAGE Lamp Does Not Light – No Lamp Indication

Disconnect CKI-ALCA Interface Cable from Test Set Junction Box. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connector P2, from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

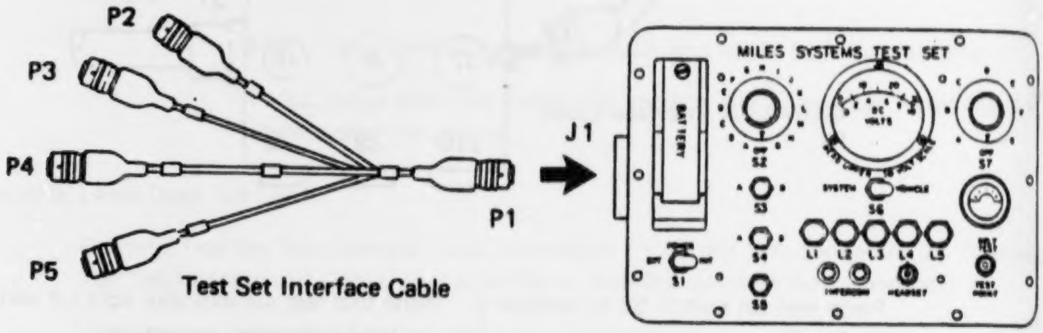
CORRECTIVE ACTION

---

2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(4A) ENGAGE Lamp Does Not Light - No Lamp Indication (Cont)

Connect Test Set Interface Cable, connector P1, to test set, connector J1.


P2
P3
P4
P5
P1
J1
Test Set Interface Cable
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
OFF
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
INTERCOM
HEADSET
TEST PROBE

Connect ALCA Interface Cable, connector P7 (Yellow) to Test Set Interface Cable, connector P2.

Insert a Controller (Green) Key into WEAPON Key receptacle and turn counterclockwise to CONTROLLER position. Turn back and remove key. (Note that test set indicator L4 may be ON. This indication has no effect on the troubleshooting procedure.)

Check status of test set indicator lamp L2.

If lamp L2 is ON, replace defective CKI-ALCA Interface Cable and return system to service.

If lamp L2 is not ON, replace ALCA Adapter Assembly and return system to service.

(4B) ENGAGE Lamp Does Not Light - L2 Does Not Flash

Disconnect CKI-ALCA Interface Cable from Test Set Interface Cable. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connector P2 (Yellow), from ALCA Interface Cable, connector P7 (Yellow).

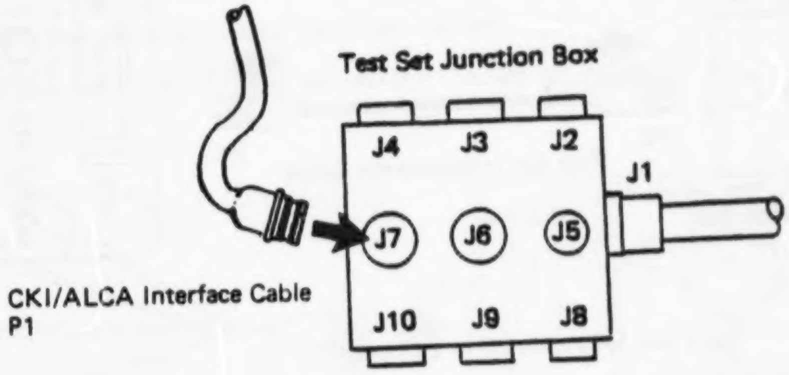
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.



Connect ALCA Interface Cable, connector P7 (Yellow) to Test Set Interface Cable, connector P2.

Insert a Controller (Green) Key into WEAPON Key receptacle and turn counterclockwise to CONTROLLER position. Turn back and remove key.

Aim a Controller Gun at detector belts and fire a "NEAR MISS" signal. Check test set indicator lamp L2.

If lamp L2 flashes ON/OFF, replace defective CKI-ALCA Interface Cable and return system to service.

If lamp L2 does not flash ON/OFF, replace defective ALCA Adapter Assembly and return system to service.

(5) ENGAGE Lamp Does Not Reset

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

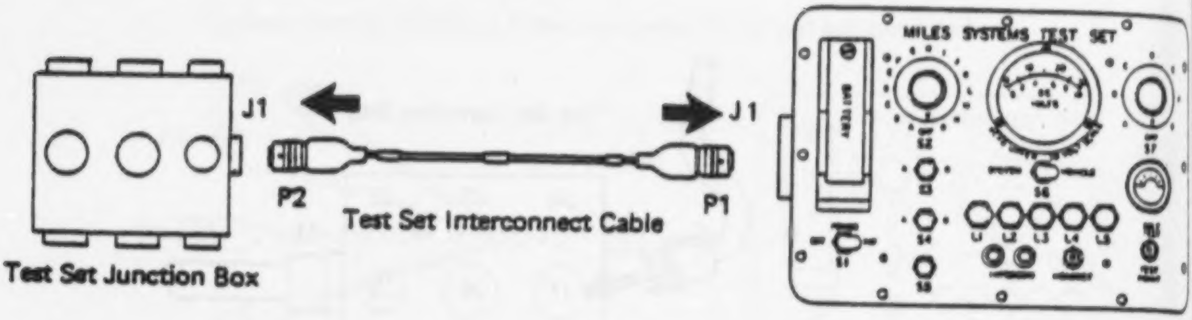
TEST OR INSPECTION

CORRECTIVE ACTION

---

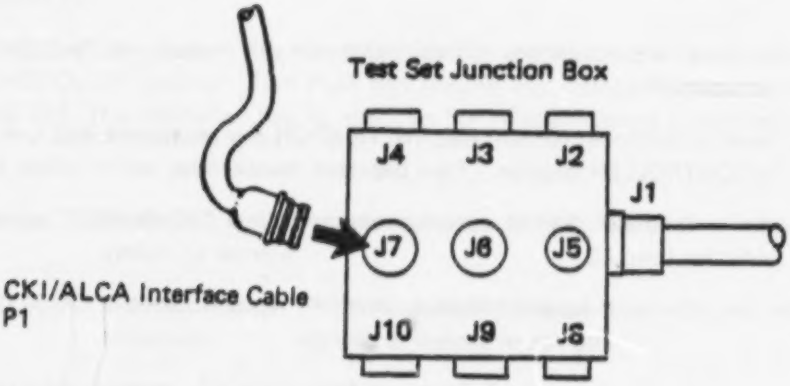
2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(5) ENGAGE Lamp Does Not Reset (Cont)


J1
J1
P2
Test Set Interconnect Cable
P1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S6
L1
L2
L3
L4
L5
S1
S2
S3
S4
S5
S7

Place test set switch S1 to EXT position.

Disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect to connector J7 on Test Set Junction Box.


Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
CKI/ALCA Interface Cable
P1

Place test set switch S2 to position N. (Note that test set indicator L4 may be ON. This indication has no effect on troubleshooting procedures.)

Check test set indicator lamp L2.

If lamp L2 is ON, replace defective CKI and return system to service.

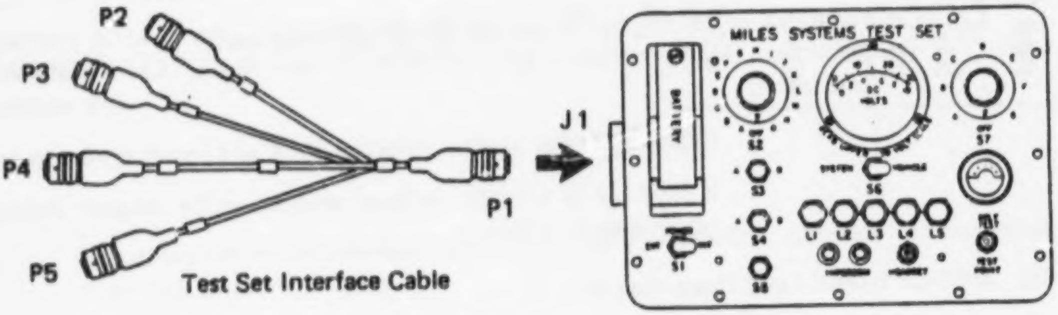
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

If lamp L2 is not ON, disconnect CKI-ALCA Interface Cable from Test Set Junction Box. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connector P2 (Yellow), from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.



Connect ALCA Interface Cable, connector P7 (Yellow) to Test Set Interface Cable, connector P2. (Note that test set indicator lamp L4 may be ON. This indication has no effect on troubleshooting procedures.)

Check Test set indicator lamp L2.

If lamp L2 is ON, replace defective CKI-ALCA Interface Cable and return system to service.

If lamp L2 is not ON, disconnect the AKI/Smoke Indicator Cable, connector P1, from AKI. Check test set indicator lamp L2.

If lamp L2 is ON, replace defective AKI and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(5) ENGAGE Lamp Does Not Reset (Cont)

If lamp L2 is not ON, reconnect AKI/Smoke Indicator Cable to AKI. Disconnect AKI/Smoke Indicator Cable, connector P2 (Blue), from ALCA Interface Cable, connector P9 (Blue). Check test set indicator lamp L2.

If lamp L2 is ON, replace defective AKI/Smoke Indicator Cable and return system to service.

If lamp L2 is not ON, reconnect AKI/Smoke Indicator Cable to ALCA Interface Cable. Disconnect ALCA Interface Cable, connector P1 from ALCA. Check test set indicator lamp L2.

If lamp L2 is ON, replace defective ALCA and return system to service.

If lamp L2 is not ON, replace defective ALCA Adapter Assembly and return system to service.

(6) MISSILE TRACK Lamp Does Not Light

NOTE

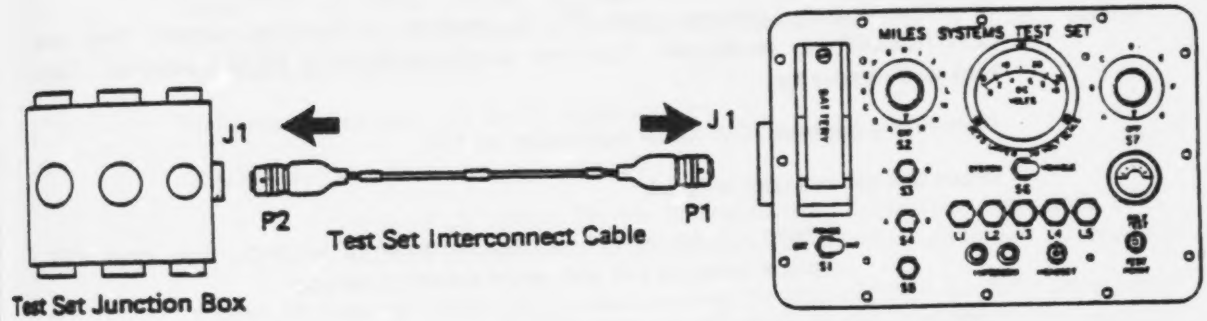
If the MISSILE TRACK lamp lights momentarily (2 - 3 seconds) when a TOW Missile is fired, see Programmer Control Panel (PCP), item 10.

MALFUNCTION

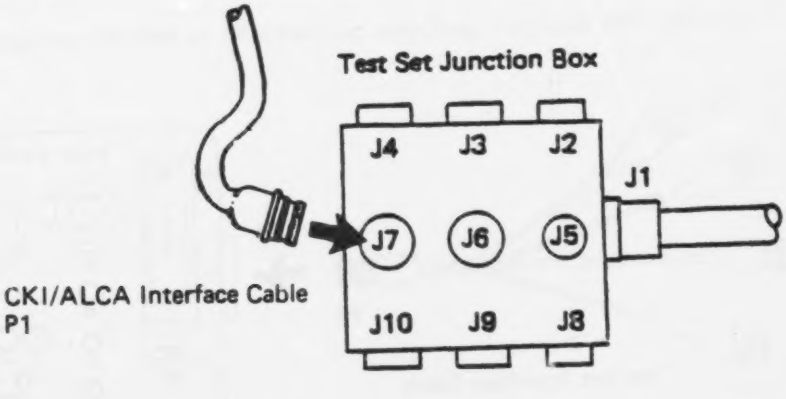
TEST OR INSPECTION

CORRECTIVE ACTION

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
J1
P1
MILES SYSTEMS TEST SET
BATTERY
S2
S3
S4
S5
S6
S7
S1
L1
L2
L3
L4
L5
Test Set Junction Box

Disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect it to connector J7 on Test Set Junction Box.


Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
CKI/ALCA Interface Cable
P1
J10
J9
J8

Place test set switch S2 to 0 position. (Note that test set indicator lights L2 and L4 may be ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(6) MISSILE TRACK Lamp Does Not Light (Cont)

At either Rocket Launcher, reset TTI by inserting a Controller (Green) Key into CONTROLLER key receptacle. Turn key counterclockwise to RESET position. Turn back and remove key.

Momentarily depress TOW XMTR pushbutton on TTI.

Check test set indicator lamp L3.

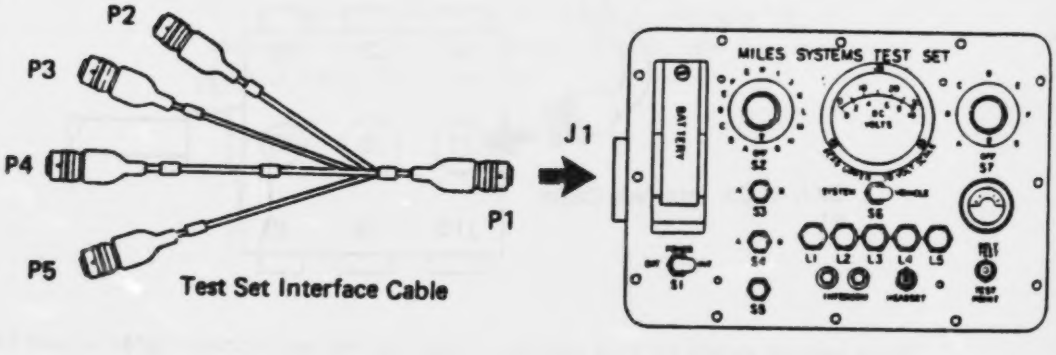
If lamp L3 comes ON for approximately 12 seconds, then goes OFF, replace defective CKI and return system to service.

If lamp L3 fails to come ON for approximately 12 seconds, then go to OFF, disconnect the CKI-ALCA Interface Cable from test set. Reconnect it to CKI.

Disconnect CKI-ALCA Interface Cable, connector P2 (Yellow), from ALCA Interface Cable, connector P7 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.


P2
P3
P4
P5
P1
Test Set Interface Cable
J1
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
HEADSET

Connect ALCA Interface Cable, connnector P7 (Yellow) to Test Set Interface Cable, connector P2.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Insert a Controller (Green) Key into WEAPON Key receptacle and turn counterclockwise to CONTROLLER position. Turn back and remove key.

Reset TTI at either rocket launcher. Insert a Controller (Green) Key into a CONTROLLER key receptacle on TTI and turn counterclockwise to RESET position. Turn back and remove key.

Momentarily depress TOW XMTR pushbutton on TTI.

Check status of test set indicator lamp L3.

If lamp L3 comes ON for approximately 12 seconds, then goes OFF, replace defective CKI-ALCA Interface Cable and return system to service.

If lamp L3 does not come ON for approximately 12 seconds then go OFF, disconnect ALCA Interface Cable from Test Set Interface Cable. Reconnect it to CKI-ALCA Interface Cable, connector P2 (Yellow).

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

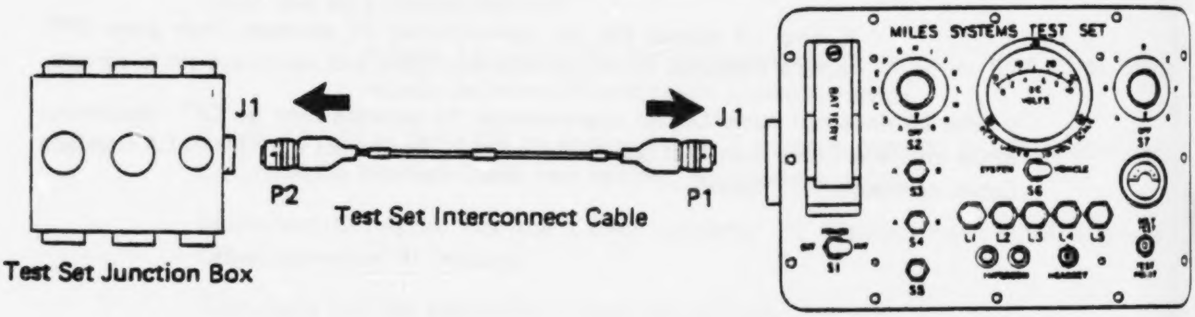
2. COCKPIT KILL INDICATOR (CKI) TEST (CONT)

(6) MISSILE TRACK Lamp Does Not Light (Cont)

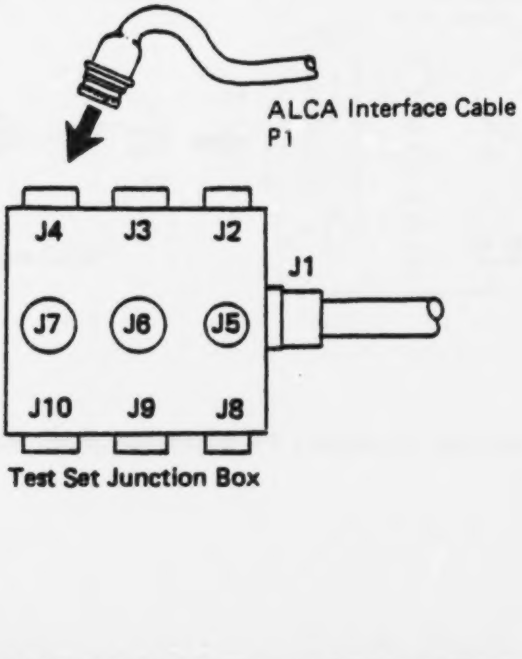
Place test set switch S2 in OFF position.

Disconnect Test Set Interface Cable from test set.

Reconnect Test Set Interconnect Cable, connector P1, to test set, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S2
S7
S3
S6
S4
S1
S5
L1
L2
L3
L4
L5

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA and connect to connector J4 on Test Set Junction Box.


ALCA Interface Cable
P1
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
Test Set Junction Box

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Place test set switch S7 to position C. Check MISSILE TRACK lamp on CKI.

If MISSILE TRACK lamp is ON, replace defective ALCA and return system to service.

If MISSILE TRACK lamp is not ON, replace ALCA Adapter Assembly and return unit to service.

3. SMOKE ASSEMBLY TEST

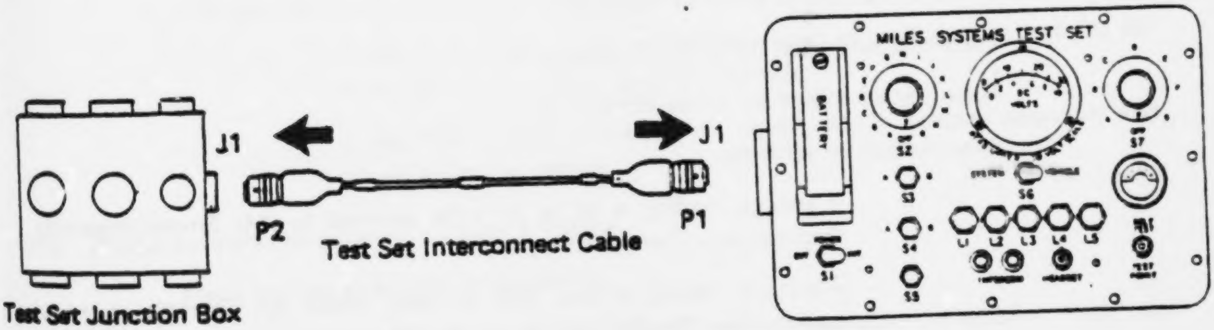
(1) Smoke Assembly Inoperative

Before proceeding check that:

TSGMS circuit breaker (located in battery compartment) is ON.

ALCA Interface Cable, connector P2, is properly connected to connector 20J237 in Ammo Bay.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S2
DC VOLTS
SYSTEM
VEHICLE
S6
S7
S3
S4
S5
S1
L1
L2
L3
L4
L5
HEADSET
TEST POINT

Disconnect AKI/Smoke Indicator Cable, connector P3, from Smoke Assembly. Connect it to connector J5 on Test Set Junction Box.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

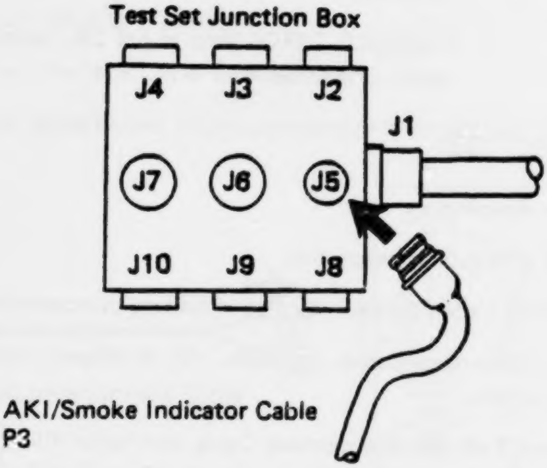
TEST OR INSPECTION

CORRECTIVE ACTION

---

3. SMOKE ASSEMBLY TEST (CONT)

(1) Smoke Assembly Inoperative (Cont)



Insert a 9 V battery in test set battery box.

Place test set switch S1 to INT position.

Place test set switch S2 to the O position.

Place test set switch S6 to the VEHICLE position.

Read voltage on voltmeter.

If voltage reading is 20 to 30 volts, proceed to (1A) Smoke Assembly Inoperative - Correct Voltage.

If voltage reading is less than 20 volts, check out aircraft's electrical system. See TM 55-1520-236-10. Repair all malfunctions and return unit to service.

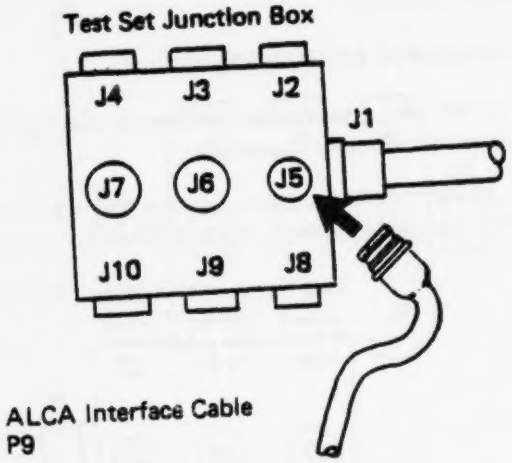
If there is no voltage shown on voltmeter, disconnect AKI/Smoke Indicator Cable from Test Set Junction Box. Reconnect it to Smoke Assembly.

Disconnect ALCA Interface Cable, connector P9 (Blue), from AKI/Smoke Indicator Cable, connector P2 (Blue). Connect connector P9 (Blue), to connector J5 on Test Set Junction Box.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION



Read voltage on voltmeter.

If voltage reading is 20 to 30 volts, replace defective AKI/Smoke Indicator Cable and return system to service.

If voltage reading is less than 20 volts, check out aircraft's electrical system.

If electrical system is not operational, repair all malfunctions (see TM 55-1520-236-10) and return system to service.

If electrical system is operational, replace ALCA Adapter Assembly and return system to service.

(1A) Smoke Assembly Inoperative – Correct Voltage

Place test set switch S7 to position G.

Insert a Vehicle (Orange) Key into WEAPON key receptacle on ALCA. Turn key clockwise to WEAPON position.

Check test set indicator light L3.

If lamp L3 is ON, replace defective Smoke Assembly and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

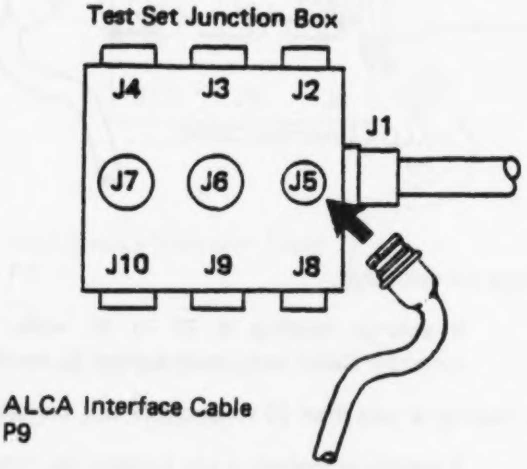
---

3. SMOKE ASSEMBLY TEST (CONT)

(1A) Smoke Assembly Inoperative - Correct Voltage (Cont)

If lamp L3 is not ON, disconnect AKI/Smoke Indicator Cable from Test Set Junction Box. Reconnect it to Smoke Assembly.

Disconnect ALCA Interface Cable, connector P9 (Blue), from AKI/Smoke Cable, connector P2. Connect connector P9 to connector J5 on Test Set Junction Box.



Check test set indicator light L3.

If lamp L3 is ON, replace defective AKI/Smoke Indicator Cable and return system to service.

If lamp L3 is not ON, disconnect ALCA Interface Cable from Test Set Junction Box. Reconnect to AKI/Smoke Indicator Cable, connector P2.

Place test set switch S1 to EXT position.

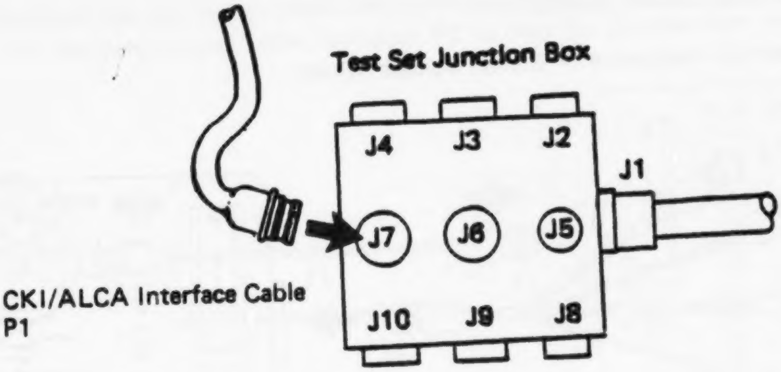
Place test set switch S2 to OFF.

Disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect to connector J7 on Test Set Junction Box.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION



Ensure that Smoke Assembly extractor is pulled out.

Place test set switch S7 to position F. Momentarily depress test set switch S5. Check Smoke Assembly.

If Smoke Assembly operates correctly (extractor is pulled in housing), replace defective CKI and return system to service.

If Smoke Assembly fails to operate, disconnect CKI/ALCA Interface Cable from Test Set Junction Box. Reconnect it to the CKI.

Disconnect ALCA Interface Cable, connector P7 (Yellow), from CKI-ALCA Interface Cable, connector P2 (Yellow).

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

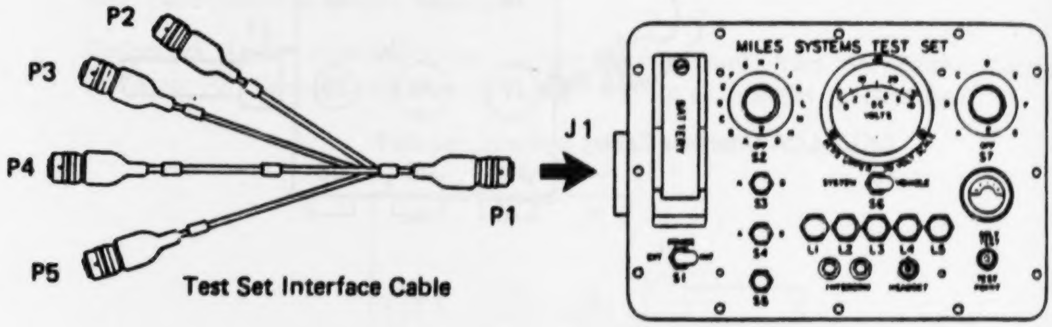
TEST OR INSPECTION

CORRECTIVE ACTION

---

3. SMOKE ASSEMBLY TEST (CONT)

(1A) Smoke Assembly Inoperative - Correct Voltage (Cont)


P2
P3
P4
P5
P1
J1
Test Set Interface Cable
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
DC VOLTS
TEST POINT

Connect ALCA Interface Cable, connector P7, to Test Set Interface Cable, connector P2.

Place test set switch S7 to position F. Momentarily depress test set switch S5. Check Smoke Assembly.

If Smoke Assembly operates properly (extractor is pulled into housing) replace defective CKI-ALCA Interface Cable and return system to service.

If Smoke Assembly fails to operate properly, replace ALCA Adapter Assembly and return system to service.

4. AIRCRAFT KILL INDICATOR (AKI) TEST

(1) AKI Inoperative With Correct CKI Lamp Indication

Before proceeding check that:

TSGMS circuit breaker (located in battery compartment) is ON.

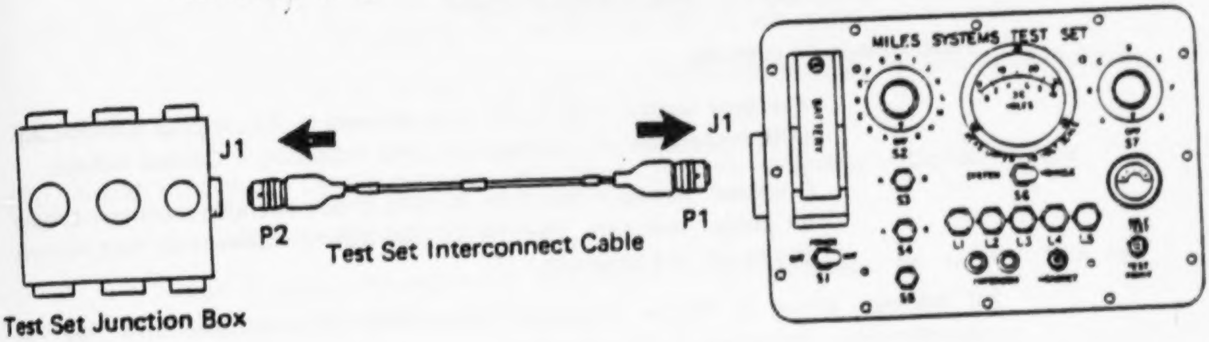
ALCA Interface Cable, connector P2, is properly connected to connector 20J237 in Ammunition Bay.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5
J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box

Install 9 V battery in test set battery box.

Place test set switch S1 to INT position.

Place test set switch S2 to the O position.

Place test set switch S6 to the VEHICLE position.

Disconnect AKI/Smoke Indicator Cable, connector P3, from AKI Assembly. Connect to connector J3 on test set.

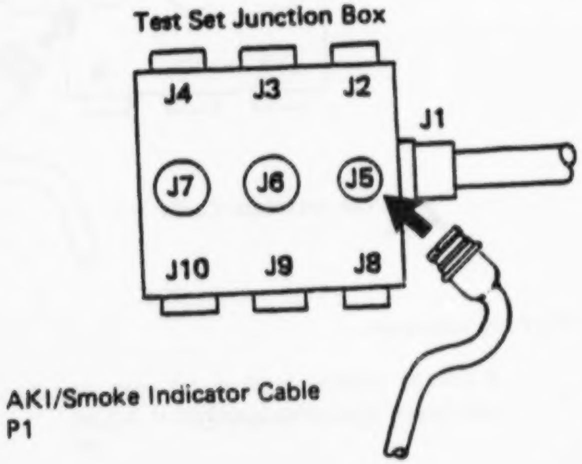

Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
AKI/Smoke Indicator Cable
P1

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

4. AIRCRAFT KILL INDICATOR (AKI) TEST (CONT)

(1) AKI Inoperative With Correct CKI Lamp Indication (Cont)

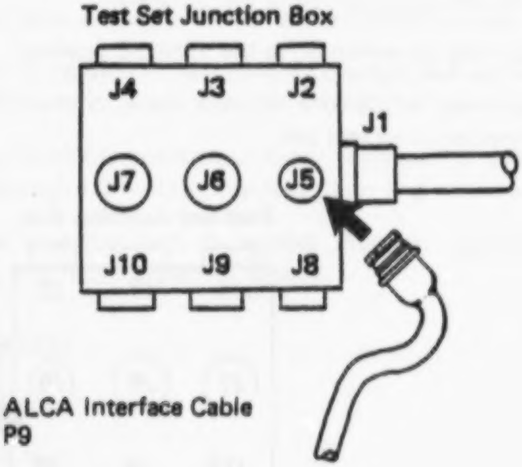
Read voltage on voltmeter.

If voltage reading is 20 to 30 volts, proceed to (1A) Aircraft Kill Indicator (AKI) Inoperative with Correct CKI Lamp Indication - Correct Voltage.

If voltage reading is less than 20 volts, check aircraft's electrical system for proper operation. See TM 55-1520-236-10. Correct all malfunctions and return unit to service.

If voltmeter shows no voltage, disconnect AKI/Smoke Indicator Cable from Test Set Junction Box. Reconnect to AKI Assembly.

Disconnect ALCA Interface Cable, connector P9 (Blue), from AKI/Smoke Indicator Cable, connector P2. Connect connector P9 to connector J5 on test set Test Set Junction Box.



Read voltage on voltmeters.

If voltage reading is 20 to 30 volts, replace defective AKI/Smoke Cable and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If voltage reading is not correct, verify AH-1S electrical system is functional.

If AH-1S electrical system is not functioning properly, correct any malfunctions (see TM 55-1520-236-10) and return unit to service.

If AH-1S electrical system is functioning properly, replace ALCA Adapter Assembly.

(1A) Aircraft Kill Indicator (AKI) Inoperative With Correct CKI Lamp Indication – Correct Voltage

Turn test set switch S6 to E position.

Insert a Vehicle (Orange) Key into WEAPON key receptacle on ALCA. Turn key clockwise to WEAPON position.

Check test set indicator lamp L2.

If lamp L2 flashes ON/OFF, replace defective AKI Assembly and return system to service.

If lamp L2 does not flash ON/OFF, disconnect AKI/Smoke Indicator Cable from Test Set Junction Box. Reconnect it to AKI Assembly.

Disconnect ALCA Interface Cable, connector P9 (Blue), from AKI/Smoke Indicator Cable, connector P2 (Blue). Connect connector P9 to connector J5 on Test Set Junction Box.

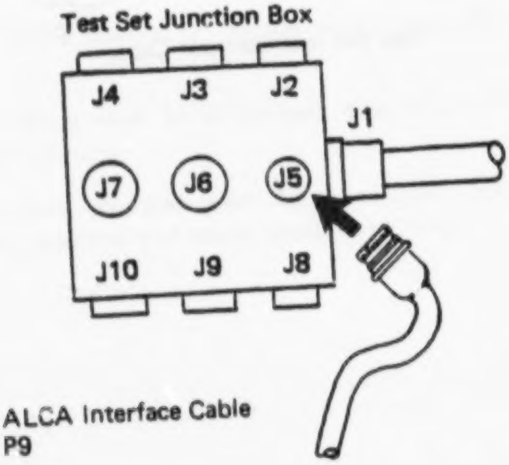


Table 3-2. Troubleshooting – With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

4. AIRCRAFT KILL INDICATOR (AKI) TEST (CONT)

(1A) Aircraft Kill Indicator (AKI) Inoperative With Correct CKI Lamp Indication – Correct Voltage (Cont)

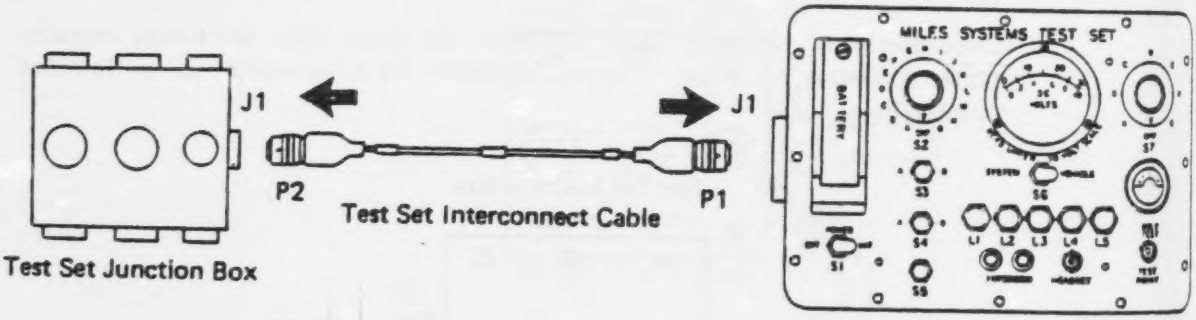
Check test set indicator light L2.

If lamp L2 flashes ON/OFF, replace defective AKI/Smoke Indicator Cable and return system to service.

If lamp L2 does not flash ON/OFF, replace defective ALCA Adapter Assembly and return system to service.

(2) AKI Inoperative With No CKI ENGAGE Lamp Indication

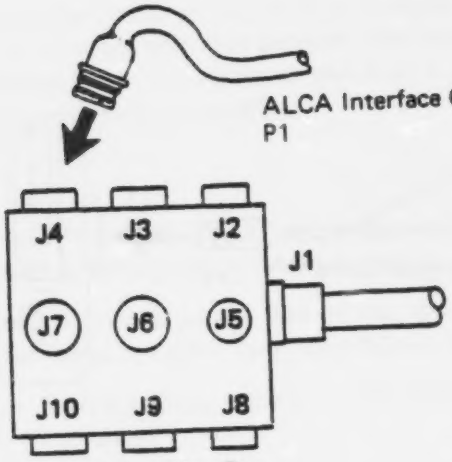
Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S2
S7
S3
S6
S4
S1
S5
L1
L2
L3
L4
L5

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Place test set switch S1 to EXT position.

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA. Connect it to connector J4 on Test Set Junction Box.



Test Set Junction Box

Place test set switch S7 to position G. Momentarily depress and release switch S5. Check AKI.

If AKI flashes when S5 is released, replace defective ALCA and return system to service.

If AKI does not flash when S5 is released, replace defective ALCA Adapter Assembly and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

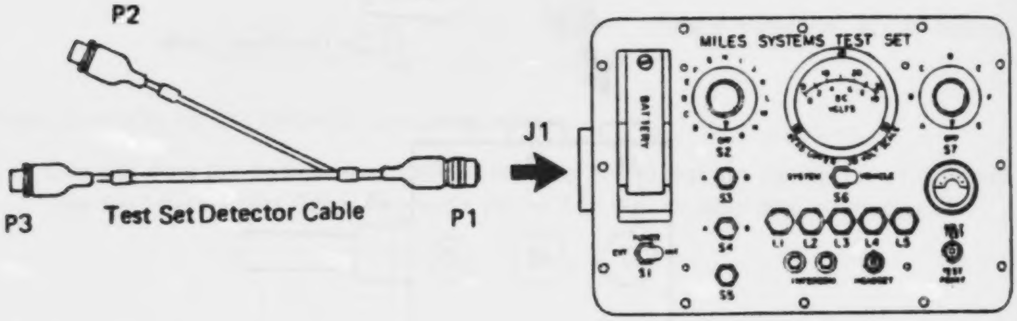
CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST

(1) Sail Detector Belt Fails

Connect Test Set Detector Cable, connector P1, to test set, connector J1.


P2
J1
P3
Test Set Detector Cable
P1
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S1
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
L1
L2
L3
L4
L5

Disconnect Sail Detector Belt from Sail Detector Belt Cable.

Connect Test Set Detector Cable, connector P2, to Sail Detector Belt and connector P3 to Sail Detector Belt Cable, connector P2.

Place test set switch S6 to the SYSTEM position.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, proceed to (1A) Sail Detector Belt Faulty - Incorrect Voltage.

If voltage reading is 8.5 to 13 volts, aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS" signal.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Check test set BELT TEST meter.

NOTE

When firing the Controller Gun at faulty Detector Belts, maintain a minimum of 5 feet between Controller Gun and Detector Belts. At distances less than 5 feet, a FALSE Bit Rate reading is possible.

If BELT TEST meter bit rate is less than 96 bits, replace faulty Sail Detector Belt and return system to service.

If BELT TEST meter bit rate is greater than 96 bits, disconnect Sail Detector Belt and Cable from Test Set Detector Cable. Reconnect them to each other.

Disconnect ALCA Interface Cable, connector P6 (Orange), from Sail Detector Belt Cable, connector P1 (Orange).

Connect Test Set Detector Cable, connector P1, to Sail Detector Belt Cable and connector P3 to ALCA Interface Cable, connector P6 (Orange).

Aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS' signal. Check BELT TEST meter.

If BELT TEST meter indicates greater than 96 bits, replace defective ALCA Adapter Assembly and return system to service.

If BELT TEST meter indicates less than 96 bits, replace defective Sail Detector Belt Cable and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(1A) Sail Detector Belt Faulty - Incorrect Voltage

Disconnect Sail Detector Belt and Cable from Test Set Detector Cable and reconnect to each other.

Disconnect the ALCA Interface Cable, connector P6 (Orange), from Sail Detector Belt Cable, connector P1 (Orange).

Connect Test Set Detector Cable, connector P1, to Sail Detector Belt Cable and connector P3 to ALCA Interface Cable, connector P6 (Orange).

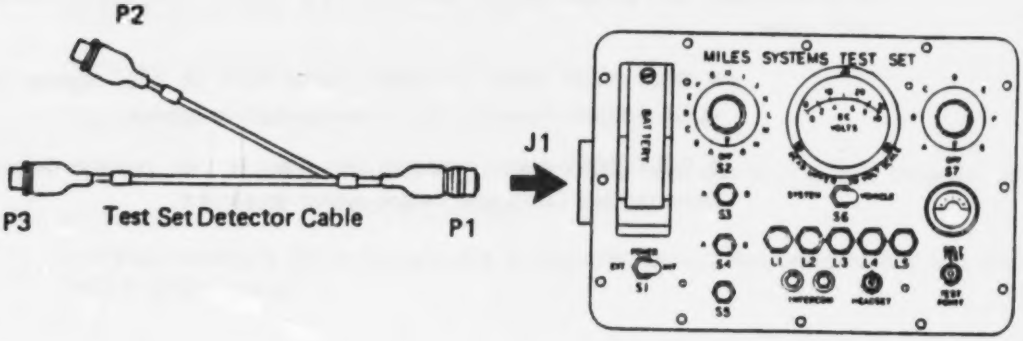
Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective Sail Detector Belt Cable and return system to service.

If voltage reading is less than 8.5 volts, replace defective ALCA Adapter Assembly and return system to service.

(2) TOW Detector Rack Fails

Connect Test Set Detector Cable, connector P1, to test set, connector J1.


P2
P3
Test Set Detector Cable
P1
J1
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5
VOLTS
SYSTEM
VEHICLE
INTERCOM
HEADSET
TEST POINT

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Disconnect TOW Detector/Launcher Cable from TOW Detector Rack.

Connect Test Set Detector Cable, connector P2, to TOW Detector Rack and connector P3 to TOW Detector/Launcher Cable, connector P1.

Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter.

> If voltage reading is less than 8.5 to 13 volts, proceed to (2A) TOW Detector Rack Inoperative - Voltage Incorrect.

If voltage reading is 8.5 to 13 volts, aim a Controller Gun at TOW Detector Rack and fire a "NEAR MISS" signal.

Check test set BELT TEST meter.

NOTE

When firing the Controller Gun at faulty Detector Belts, maintain a minimum of 5 feet between Controller Gun and Detector Belts. At distances less than 5 feet, a FALSE bit rate reading is possible.

> If BELT TEST meter indicates less than 96 bits, replace defective TOW Detector Rack and return system to service.

If BELT TEST meter indicates greater than 96 bits, disconnect TOW Detector Rack and Cable from Test Set Detector Cable.

Replace TOW Detector Cable with same cable assembly from opposite side of aircraft.

Aim a Controller Gun at TOW Detector Rack and fire a "NEAR MISS" signal. Check test set BELT TEST meter.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(2) TOW Detector Rack Fails (Cont)

If BELT TEST meter indicates greater than 96 bits, replace defective TOW Detector/Launcher Cable and return system to service.

If BELT TEST meter indicates less than 96 bits, replace defective Rocket Launcher and return system to service.

(2A) TOW Detector Rack Inoperative - Voltage Incorrect

Disconnect TOW Detector Rack and Cable from Test Set Detector Cable.

Replace TOW Detector Cable with same cable assembly from opposite side of aircraft. Reconnect Test Set Detector Cable, connector P2, to TOW Detector Rack and connector P3 to new cable.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace previously disconnected TOW Detector/Launcher Cable and return system to service.

If voltage reading is incorrect, replace defective Rocket Launcher and return system to service.

(3) MILES Rocket Launcher Detectors Fails

Inoperative Rocket Launcher Detectors when adjacent TOW Detector Rack is functional indicates a problem with Rocket Launcher.

Replace defective Rocket Launcher and return system to service.

(4) TOW Detector Rack And MILES Rocket Launcher Detectors Fail

Reset ALCA

Disconnect TOW Detector/Launcher Cable, connector P2, from Rocket Launcher, connector J2.

Aim a Controller Gun at Rocket Launcher Detectors and fire a "NEAR MISS" signal. Check AKI and/or CKI.

MALFUNCTION

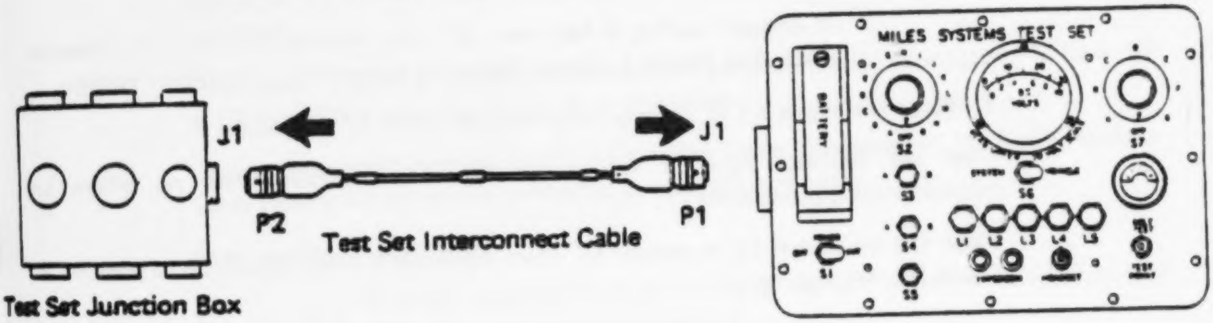
TEST OR INSPECTION

CORRECTIVE ACTION

If AKI and/or CKI indicate a "NEAR MISS," either TOW Detector Rack or TOW Detector/Launcher Cable is defective. Refer to section 5 (2) TOW Detector Rack Fails, for fault isolation procedure.

If AKI and/or CKI do not indicate a "NEAR MISS," , disconnect ALCA/Launcher Cable, connector P2, from the Rocket Launcher, connector J1.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
J1
P1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Connect ALCA/Launcher Cable, connector P2, to connector J7 on Test Set Junction Box.

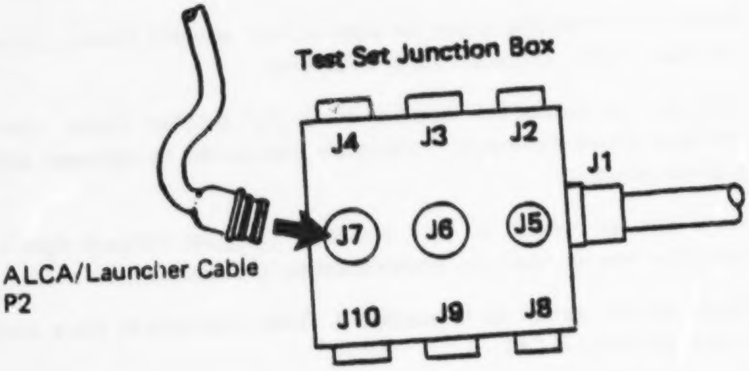

Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
ALCA/Launcher Cable
P2

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(4) TOW Detector Rack And MILES Rocket Launcher Detectors Fail (Cont)

(Note that test set indicator light L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter.

If voltage reading is less than 8.5 volts, proceed to (4A) TOW Detector Rack And Rocket Launcher Detectors Inoperative - Incorrect Voltage.

If voltage reading is 8.5 to 13 volts, place test set switch S7 to position F.

(Test set indicator light L5 may come ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S2 to position B. Then momentarily place switch S3 to position B. Check the AKI and/or CKI.

If AKI and/or CKI give a "NEAR MISS" indication, replace defective Rocket Launcher and return system to service.

If AKI and/or CKI do not give a "NEAR MISS" indication, disconnect suspected inoperative ALCA/Launcher Cable, connector P1, from ALCA Interface Cable, connector P5 or P10 (Red). Note which connector was previously connected; P5 or P10 (Red).

Disconnect remaining (opposite side) ALCA/Launcher Cable, connector P1, from ALCA Interface Cable, connector P5 or P10 (Red).

Connect the suspected inoperative ALCA/Launcher Cable, connector P1 to ALCA Interface Cable Connector, previously connected to opposite side cable. (Refer to previous steps.)

Place test set switch S7 to F position. (Test set indicator light L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S2 to position B. Then momentarily place switch S3 to position B. Check AKI and/or CKI.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If AKI and/or CKI do not give a "NEAR MISS" indication, replace defective ALCA/Launcher Cable and return system to service.

If AKI and/or CKI give a "NEAR MISS" indication, replace defective ALCA Adapter Assembly and return system to service.

(4A) TOW Detector Rack And Rocket Launcher Detectors Inoperative - Voltage Incorrect

Disconnect ALCA/Launcher Cable, connector P1, from ALCA Interface Cable, connector P5 or P10 (Red). . Note which connector was previously connected, P5 or P10 (Red).

Disconnect remaining (opposite side) ALCA/Launcher Cable, connector P1, from the ALCA Interface Cable, connector P5 or P10 (Red).

Connect suspected inoperative ALCA/Launcher Cable, connector P1, to ALCA Interface Cable Connector previously connected to opposite side cable.

Read voltage on voltmeter.

If voltage reading is 8.5 to 13 volts, replace defective ALCA Interface Cable and return system to service.

If voltage reading is less than 8.5 volts, replace defective ALCA Adapter Assembly and return system to service.

Table 3-2. Troubleshooting – With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

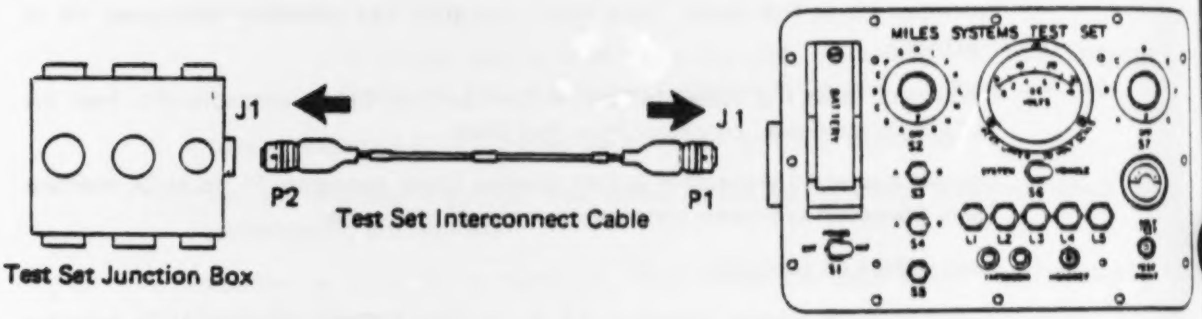
CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

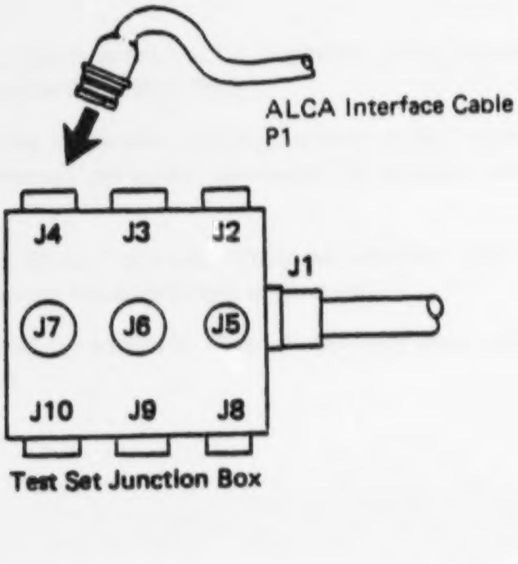
(5) All Detector Assemblies Fail

Connect Test Set Interconnect Cable Assembly, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Disconnect ALCA Interface Cable, connector P1 (Yellow), from ALCA. Connect it to connector J4 on Test Set Junction Box.


ALCA Interface Cable
P1
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
Test Set Junction Box

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Read the bit rate from detector belts on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 5 detector belts.

Table 3-2.1

Detector Belt Bit Rate

Number of Belts	Full Sun	Shade
1	0 - 10	0 - 2
2	0 - 15	0 - 4
3	0 - 20	0 - 8
4	0 - 30	0 - 10
5	0 - 40	0 - 12

If BELT TEST meter bit rate is acceptable, proceed to (5A) All Detector Assemblies Faulty - Bit Rate Good.

If BELT TEST meter bit rate is unacceptable, disconnect Sail Detector Belt.

Read detector belt bit rate on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 4 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective Sail Detector Belt and return system to service.

If BELT TEST meter bit rate is unacceptable, disconnect Sail Detector Belt Cable, connector P1, from ALCA Interface Cable, connector P6 (Orange).

Read detector belt bit rate on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 4 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective Sail Detector Belt Cable and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(5) All Detector Assemblies Fail (Cont)

If bit rate is unacceptable, reconnect Sail Detector Belt Cable and ALCA Interface Cable.

Disconnect one (1) TOW Detector Rack.

Read detector belt bit rate on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 4 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective TOW Detector Rack and return system to service.

If BELT TEST meter bit rate is unacceptable, disconnect TOW Detector Launcher Cable, connector P2, from Rocket Launcher, connector J2.

Read detector belt bit rate on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 4 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective TOW Detector Launcher Cable and return system to service.

If BELT TEST meter bit rate is not acceptable, disconnect ALCA/Launcher Cable, connector P2, from Rocket Launcher, connector J1.

Read detector belt bit rate on test set BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 3 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective Rocket Launcher and return system to service.

If BELT TEST meter bit rate is not acceptable, disconnect suspected inoperative ALCA/Launcher Cable, connector P1 (Red), from ALCA Interface Cable.

Read detector belt bit rate on BELT TEST meter. See Table 3-2.1 for determining acceptable bit rate for 3 detector belts.

If BELT TEST meter bit rate is acceptable, replace defective ALCA/Launcher Cable and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If BELT TEST meter bit rate is unacceptable, reconnect all cables previously disconnected.

Repeat previous tests for TOW Detector Rack, TOW Detector Launcher Cable, ALCA/Launcher Cable, and Rocket Launcher on opposite side of aircraft.

If BELT TEST meter bit rate is still unacceptable, replace defective ALCA Adapter Assembly and return system to service.

(5A) All Detector Assemblies Faulty - Bit Rate Good

Aim a Controller Gun at Detector Assemblies and fire a "NEAR MISS" signal. Check test set BELT TEST meter.

NOTE

When firing Controller Gun at detector belts, maintain a minimum of 5 feet between Controller Gun and detector belts. At distances less than 5 feet, a FALSE bit rate reading is possible.

If BELT TEST meter bit rate is greater than 96 bits, replace defective ALCA and return system to service.

If BELT TEST meter bit rate is less than 96 bits, disconnect the Sail Detector Belt.

Aim a Controller Gun at either TOW Detector Rack or Rocket Launcher Detectors and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace detective Sail Detector Belt and return system to service.

If BELT TEST meter bit rate is less than 96 bits, disconnect Sail Detector Belt Cable, connector P1 (Orange), from ALCA Interface Cable, connector P6 (Orange).

Aim a Controller Gun at either TOW Detector Rack or Rocket Launcher Detectors and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace defective Sail Detector Belt Cable and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

5. AIRCRAFT DETECTOR ASSEMBLIES TEST (CONT)

(5A) All Detector Assemblies Faulty - Bit Rate Good (Cont)

If BELT TEST meter bit rate is less than 96 bits, reconnect Sail Detector Belt Cable and ALCA Interface Cable.

Disconnect cable connector P1, from one TOW Detector Rack.

Aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace defective TOW Detector Rack and return system to service.

If BELT TEST meter bit rate is less than 96 bits, disconnect TOW Detector Launcher Cable, connector P2, from J2 connector on TOW Launcher.

Aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace defective TOW Detector Launcher Cable and return system to service.

If BELT TEST meter bit rate is less than 96 bits, disconnect ALCA/Launcher Cable, connector P2, from Rocket Launcher, connector J1.

Aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace defective Rocket Launcher and return system to service.

If BELT TEST meter bit rate is less than 96 bits, disconnect ALCA/Launcher Cable, connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red).

Aim a Controller Gun at Sail Detector Belt and fire a "NEAR MISS" signal. Check BELT TEST meter.

If BELT TEST meter bit rate is greater than 96 bits, replace defective ALCA/Launcher Cable and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If BELT TEST meter bit rate is less than 96 bits, reconnect all cables disconnected in previous steps.

Repeat previous tests for TOW Detector Rack, TOW Detector Launcher Cable, ALCA/Launcher Cable, and Rocket Launcher on opposite side of aircraft.

If BELT TEST meter bit rate is still unacceptable, replace defective ALCA Adapter Assembly and return system to service.

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER)

(1) One or Two Laser Tubes Inoperative

One or two laser tubes inoperative indicates a problem with 2.75" Transmitter Assembly.

Replace defective Rocket Launcher and return system to service.

(2) All Laser Tubes Inoperative

Verify 2.75" Transmitter ROUNDS REMAINING display indicates 1 or more. If not, insert a controller (green) key into CONTROLLER key receptacle on TTI and turn to RESET position. Turn back and remove key.

Place a MWLD torso harness in front of the 2.75" Transmitter. Position so detector is directly in front of laser transmitter.

Momentarily depress ROCKET XMTR pushbutton on TTI. Listen to MWLD torso harness alarm.

If MWLD alarm fails to give a "NEAR MISS" or "KILL" indication, replace defective Rocket Launcher (2.75" Transmitter) and return system to service.

If MWLD alarm gives a "NEAR MISS" or "KILL" indication, monitor AIRCRAFT TRIGGER LED on TTI.

Using aircraft's Weapon System, fire one rocket.

If AIRCRAFT TRIGGER LED does not flash ON/OFF, check out aircraft's Weapon System.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER) (CONT)

(2) All Laser Tubes Inoperative (Cont)

If RMS is not operational, repair all malfunctions (see TM 55-1520-234-10) and return system to service.

If RMS is operational, replace MILES Rocket Launcher and return system to service.

If AIRCRAFT TRIGGER LED flashes ON/OFF, place a MWLD torso harness in front of 2.75" transmitter. Position so detector is directly in front of laser transmitter.

Using aircraft's RMS, fire one (1) rocket. Check MWLD torso harness responds with a "NEAR MISS" or "KILL."

If MWLD alarm responds with a "NEAR MISS" or "KILL" indication, return system to service.

If MWLD alarm does not respond with a "NEAR MISS" or "KILL" indication, replace defective Rocket Launcher (TTI) and return system to service.

(3) Display Is Blank

Insert Controller (Green) Key into CONTROLLER key receptacle on TTI, and turn to RESET position. Turn back and remove key. Check launcher display.

If launcher display indicates 19, return system to service.

If launcher display does not indicate 19, place CKI SYSTEM switch to OFF. Pause one (1) second and place SYSTEM switch to ON.

Insert Controller (Green) Key into CONTROLLER key receptacle on TTI. Turn to RESET position. Check launcher display.

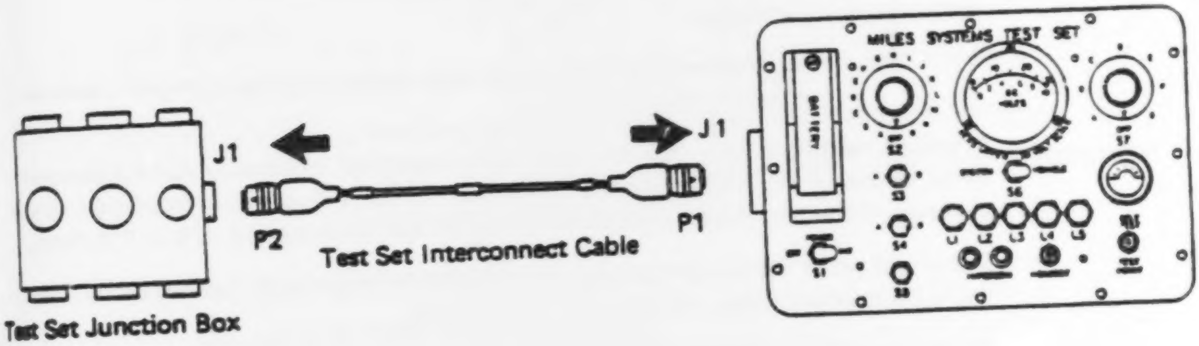
If launcher display indicates 19, return system to service.

If launcher display does not indicate 19, fire a "NEAR MISS" signal at launcher detectors using a Controller Gun. Check AKI.

If AKI flashes twice, replace Rocket Launcher (2.75" Transmitter) and return system to service.

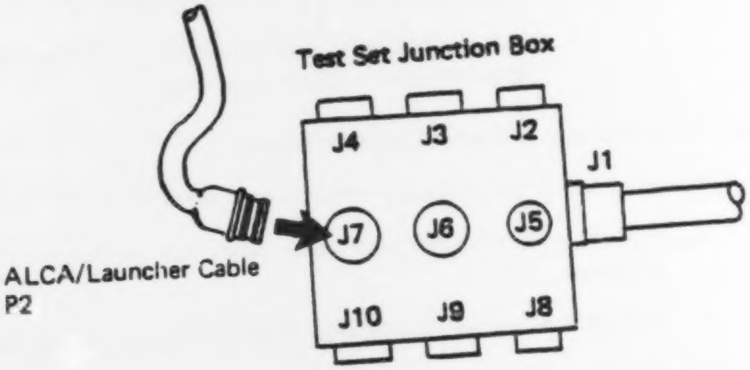
If AKI does not flash twice, disconnect ALCA/Launcher Cable, connector P2, from Rocket Launcher, connector J1.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


MILES SYSTEMS TEST SET
J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Connect ALCA/Launcher Cable, connector P2, to connector J7 on Test Set Junction Box.


Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
ALCA/Launcher Cable
P2

(Note that test set indicator light L5 may be ON. This indication has no effect on troubleshooting procedures.)

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER) (CONT)

(3) Display Is Blank (Cont)

Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter.

> If voltage reading is 8.5 to 13 volts, replace defective Rocket Launcher and return system to service.

If voltage reading is less than 8.5 volts, trace suspected inoperative ALCA/Launcher Cable, to ammo bay and disconnect connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red). Note which connector was disconnected, P5 or P10 (Red).

Disconnect other remaining (opposite side) ALCA/Launcher Cable, connector P1, from the ALCA Interface Cable, connector P5 or P10 (Red).

Connect suspected inoperative ALCA/Launcher Cable, connector P1 to ALCA Interface Cable, connector previously connected to opposite side cable.

Read voltage on voltmeter.

> If voltage reading is 8.5 to 13 volts, replace defective ALCA Adapter Assembly and return system to service.
>
> If voltage reading is less than 8.5 volts, replace defective ALCA/Launcher Cable and return system to service.

(4) Incorrect Firing Indicator or Round Display Indication

Failure of any of the following indicates a problem with 2.75" Transmitter Assembly.

1. ROUNDS REMAINING indication does not decrease when the transmitter is triggered.
2. ROUNDS REMAINING indication does not display 19 after RESET.
3. ROUNDS REMAINING display is not blank when transmitter is firing.
4. Firing indicators (the decimal points on the display) do not light when transmitter is firing.
5. The firing indicators are ON for less than 5 seconds when a single rocket is fired.

> Replace Rocket Launcher and return system to service.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

(5) Incorrect Aircraft RMS Indication

Turn aircraft's MASTER ARM switch to OFF.

Verify aircraft's wing stores circuit breakers are ON.

Reset TTI.

Turn aircraft's Master Arm switch to STANDBY. Check RMS rocket inventory.

If RMS inventory indication is correct, return system to service.

If RMS inventory indication is not correct, verify RMS is operational before replacing Rocket Launcher.

(6) 2.75" Weapon Simulator (FLASHWESS)

Turn aircraft's Master Arm switch to STBY.

Verify aircraft's wing stores circuit breakers are ON.

Momentarily depress Rocket WESS pushbutton on TTI. Check FLASHWESS.

If FLASHWESS flashes, return system to service.

If FLASHWESS fails to flash, replace defective Rocket Launcher and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

6. MILES ROCKET LAUNCHER TEST (2.75" ROCKET TRANSMITTER) (CONT)

(7) ATWESS Device Inoperative

Determine which of the following failure modes is applicable.

a. Missile Present (MSL) Indication is not indicated on Gunner's TOW Control Panel. Proceed to step 7A.

b. ATWESS does not fire when ALCA and CKI MISSILE TRACK light indicate a TOW firing. Proceed to step 7B.

NOTE

A disconnected MILES PCP assembly will prevent all ATWESS devices from firing when ALCA and CKI Missile Track light indicate a TOW firing.

(7A) ATWESS Device Inoperative - No Indication

Place ATWESS switch on TTI to SAFE/TSU TEST position.

Verify that Missile Present (MSL) indication is present on Gunner's TOW Control Panel.

If no MSL indication is present, go to (7A-1) ATWESS Device Inoperative - No Indication/TCP.

If MSL indication is present, place all ATWESS PULL TO ARM shafts to SAFE position.

Open breech door on inoperative ATWESS device and rotate ATWESS cartridge 90°. Reinstall ATWESS cartridge.

ARM each ATWESS device by pulling out PULL TO ARM shaft.

Place ATWESS switch on TTI to ARMED position.

Verify on Gunner's TOW Control Panel that Missile Present (MSL) indication is present.

If MSL indication is present, return system to service.

If MSL indication is not present, replace defective Launcher and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

(7A-1) ATWESS Device Inoperative – No Indication/TCP

Disconnect suspected inoperative TOW Missile/Launcher Cable from Launcher, connector J4, and from aircraft's TOW wing stub connector.

Remove operative TOW Missile/Launcher Cable from opposite side of aircraft and install on the side in question.

Verify on Gunner's TOW Control Panel that Missile Present (MSL) indication is present.

If MSL indication is present, replace defective TOW Missile/Launcher Cable and return system to service.

If MSL indication is not present, checkout the Weapon System.

(7B) ATWESS Device Inoperative – Indication

Place ATWESS switch on TTI to SAFE/TSU TEST position.

Place all ATWESS PULL TO ARM shafts in SAFE position.

Remove ATWESS cartridge from inoperative ATWESS device.

Check cartridge primer.

If primer is dented, ATWESS cartridge is a dud. Dispose of cartridge in accordance with local EOD procedures.

If primer is not dented, disconnect suspected inoperative TOW Missile/Launcher Cable from Launcher, connector J4, and from aircraft's TOW wing stub connector.

Remove operative TOW Missile/Launcher Cable from opposite side of aircraft. Install it on side in question.

Rearm and fire TOW system. Verify ATWESS device fires.

Install cartridge and arm each ATWESS device.

Set ATWESS switch on TTI to ARMED.

Fire TOW system.

If ATWESS fires, replace defective TOW Missile/Launcher Cable and return system to service.

If ATWESS does not fire, checkout the TOW Weapon System. Repair all malfunctions and return system to service.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

7. 20 MM LASER TRANSMITTER TEST

(1) Laser Tube Inoperative

An inoperative Laser Tube when Firing Indicators are lit indicates a problem with Transmitter Assembly.

Replace defective Transmitter Assembly and return system to service.

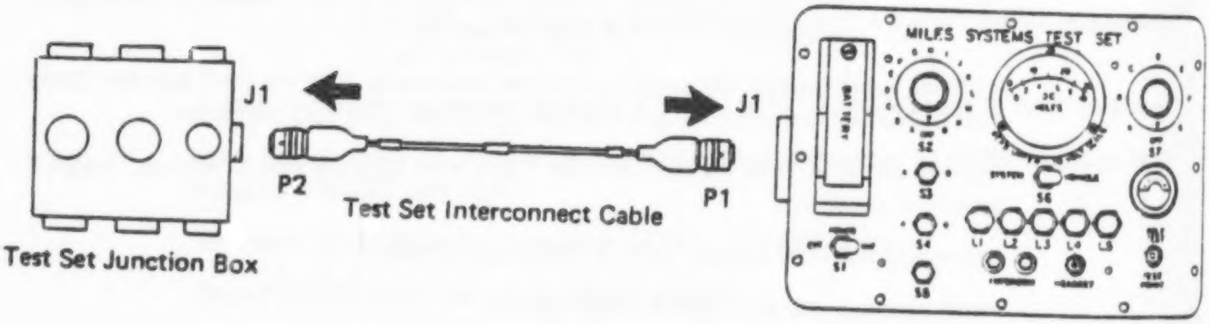
(2) Display Is Blank

Place SYSTEM switch on CKI to OFF. Pause one (1) second. Place SYSTEM switch to ON.

Insert a Controller (Green) Key into Controller key receptacle on 20 mm Transmitter. Turn key to RESET position. Turn back and remove key. Check display reading.

If display indicates 75, return system to service.

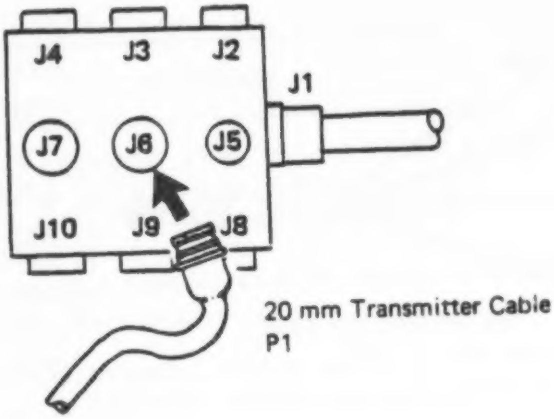
If display is still blank, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Disconnect 20 mm Transmitter Cable, connector P1, from Transmitter Assembly. Connect it to connector J6 on Test Set Junction Box.

Test Set Junction Box



Place test set switch S6 to SYSTEM position.

Read voltage on voltmeter.

> If voltage reading is 8.5 to 13 volts, replace defective Transmitter Assembly and return system to service.

If voltage reading is less than 8.5 volts, disconnect 20 mm Transmitter Cable from Test Set Junction Box. Reconnect it to 20 mm Transmitter.

Disconnect ALCA Interface Cable, connector P8 (Green), from 20 mm Transmitter Cable, connector P2.

Disconnect Test Set Interconnect Cable from test set. Connect Test Set Interface Cable, connector P1, to test set, connector J1.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

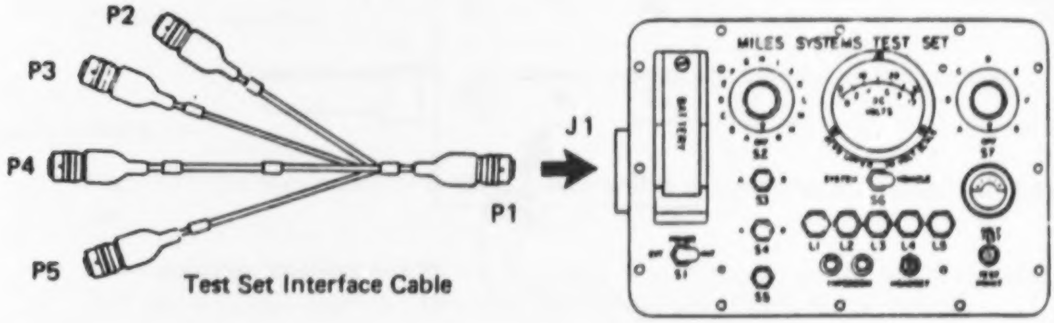
TEST OR INSPECTION

CORRECTIVE ACTION

---

7. 20 MM LASER TRANSMITTER TEST (CONT)

(2) Display Is Blank (Cont)


P2
P3
P4
P5
P1
Test Set Interface Cable
J1
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Connect ALCA interface Cable, connector P8 (Green), to connector P3 on Test Set Interface Cable.

Place test set switch S1 to EXT position.

Read voltage on voltmeter.

If voltage reading is 8.5 to 11 volts, replace defective 20 mm Transmitter Cable and return system to service.

If voltage reading is less than 8.5 volts, replace defective ALCA Adapter Assembly and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

(3) Transmitter Does Not Trigger

Reset transmitter assembly using Controller (Green) Key.

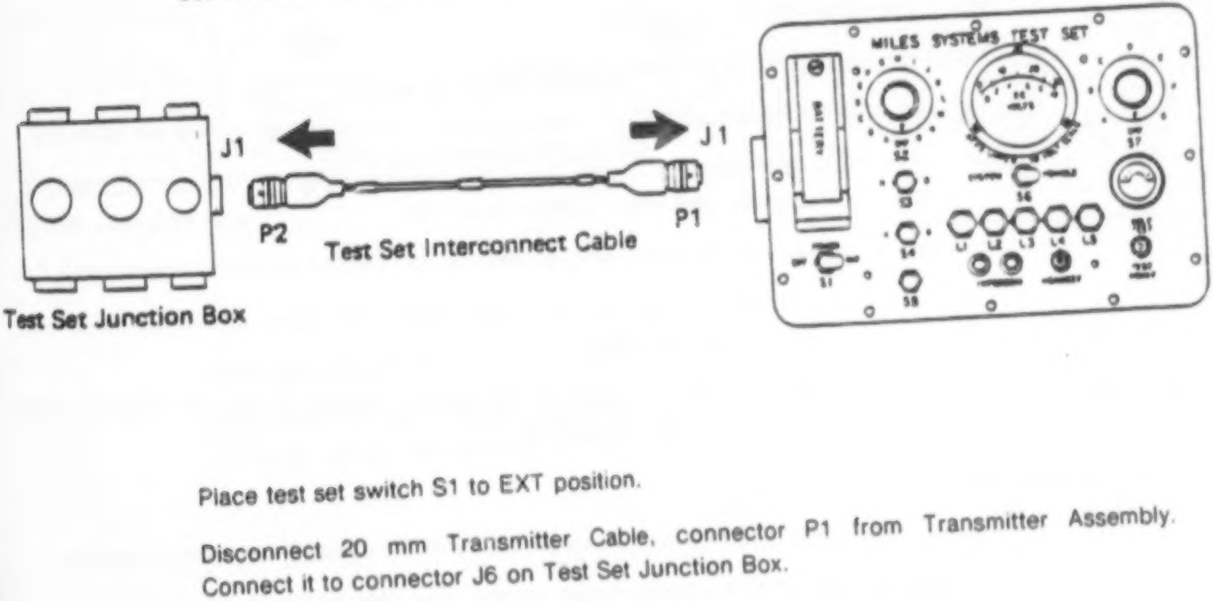
WARNING

Keep personnel clear of gun barrel. Moving gun may injure personnel.

Trigger 20 mm Transmitter Assembly using aircraft's 20 mm weapon system. Check 20 mm Transmitter display while weapon is being triggered.

If Firing Indicators (decimal points on the display) appear, replace defective Transmitter Assembly and return system to service.

If Firing Indicators do not appear, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
S7
S6
S4
S5
S1
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Disconnect 20 mm Transmitter Cable, connector P1 from Transmitter Assembly. Connect it to connector J6 on Test Set Junction Box.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

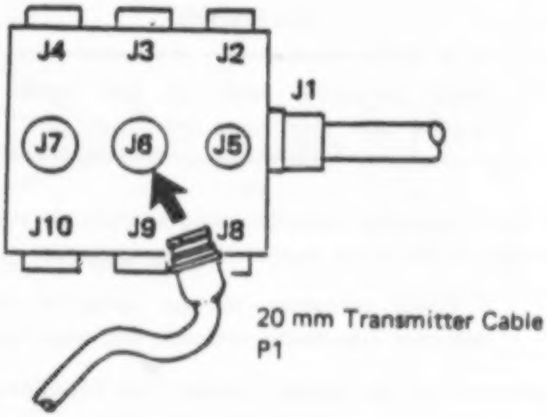
CORRECTIVE ACTION

---

7. 20 MM LASER TRANSMITTER TEST (CONT)

(3) Transmitter Does Not Trigger (Cont)

Test Set Junction Box



Place test set switch S2 to position J.

Place test set switch S6 to VEHICLE position.

Trigger test set using aircraft's 20 mm weapon system. Check voltage on test set voltmeter.

If indication is 24 to 30 volts, replace defective 20 mm Transmitter Assembly and return system to service.

If indication is less than 24 volts, verify aircraft 20 mm weapon system is operational.

If 20 mm weapon system is not operational, repair all malfunctions and return system to service.

If 20 mm weapon system is operational, replace 20 mm Transmitter Cable and return system to service.

(4) Incorrect Round Display Indication

Failure of any of the following indicates a problem with the 20 mm Transmitter Assembly.

1. ROUND COUNT X10 indication does not decrease when transmitter is triggered.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

2. ROUND COUNT X10 indication does not display 75 after reset.

3. ROUND COUNT X10 display is not blank when transmitter is firing.

Replace 20 mm Transmitter Assembly and return system to service.

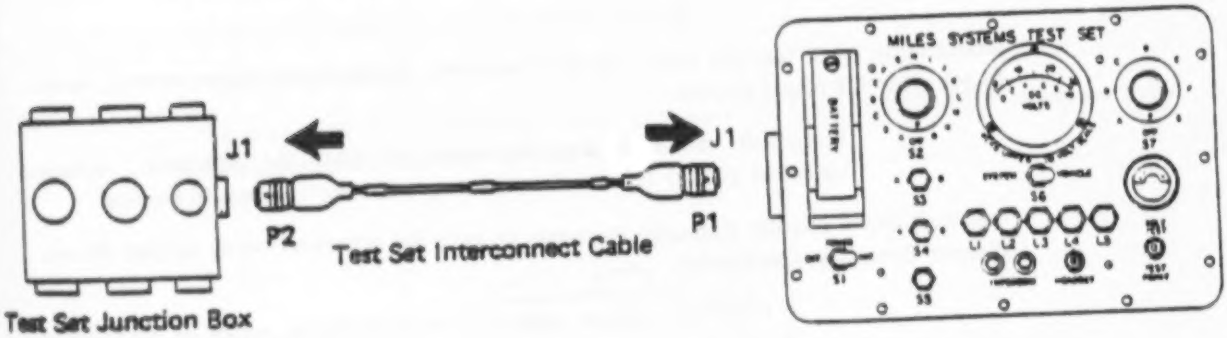
(5) Aircraft Round Counter Inoperative

Reset transmitter assembly using Controller (Green) Key.

Momentarily depress PUSH-TO TEST switch on Transmitter Assembly. Check Transmitter's display.

If RND CNTR LED does not light, replace defective 20 mm Transmitter Assembly and return system to service.

If RND CNTR LED lights, connect Test Set Interconnect Cable, connector P1, to test set connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Disconnect 20 mm Cable, connector P1 from Transmitter Assembly. Connect it to connector J6 on Test Set Junction Box.

Table 3-2. Troubleshooting – With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

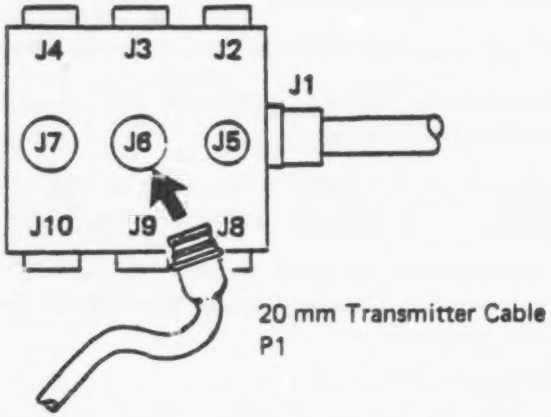
CORRECTIVE ACTION

---

7. 20 MM LASER TRANSMITTER TEST (CONT)

(5) Aircraft Round Counter Inoperative (Cont)

Test Set Junction Box



Momentarily place test set switch S4 to A position. Release and repeat several times. Check aircraft's round counter.

If aircraft round counter decreases for each S4 activation, replace defective 20 mm Transmitter Assembly and return system to service.

If aircraft round counter does not decrease for each S4 activation, verify aircraft 20 mm Weapon System is operational.

If 20 mm weapon system is not operational, repair all malfunctions and return system to service.

If 20 mm weapon system is operational, replace 20 mm Transmitter Cable Assembly and return system to service.

8. FLASHWESS TEST (20 MM)

Check the following before proceeding:

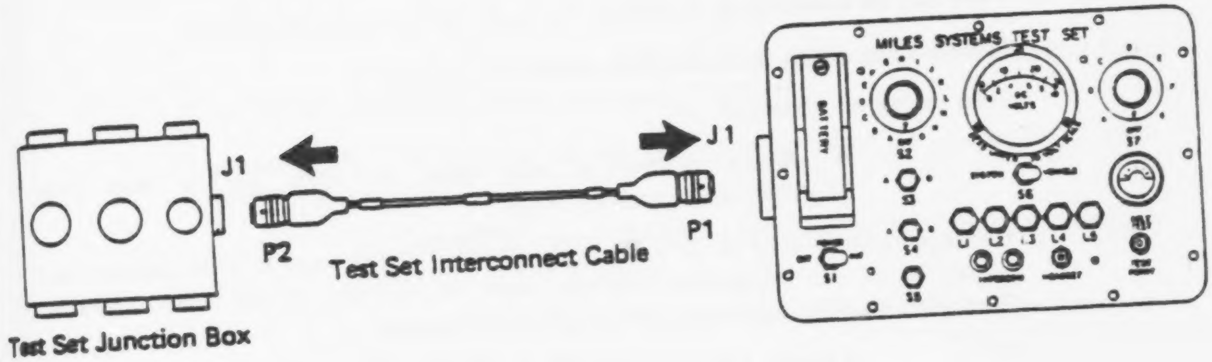
a. MASTER ARM switch is in STBY.

b. Both Wing Stores Circuit Breakers are ON.

c. 20 mm Transmitter has been reset.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


MILES SYSTEMS TEST SET
J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Install a 9 V battery in test set battery box.

Place test set switch S1 to INT position.

Disconnect 20 mm Transmitter Cable, connector P3 from FLASHWESS. Connect it to connector J5 on Test Set Junction Box.

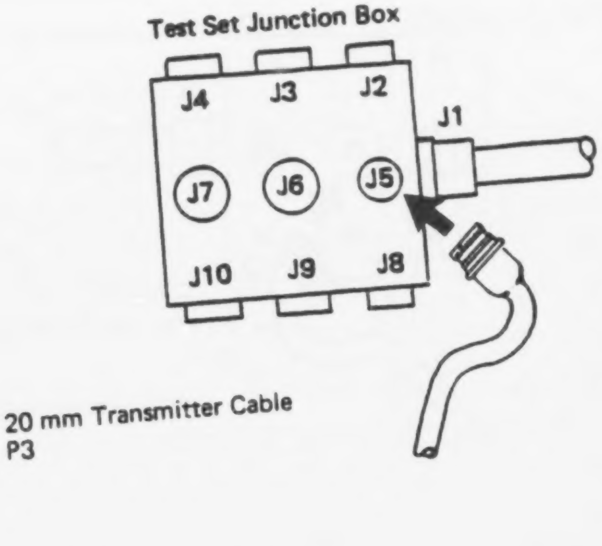

Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
20 mm Transmitter Cable
P3

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

8. FLASHWESS TEST (20 MM) (CONT)

(1) FLASHWESS Does Not Operate

Place test set switch S2 to O position.

Place test set switch S6 to VEHICLE position.

Read voltage on voltmeter.

If voltage reading is less than 24 volts, go to step (1A) FLASHWESS/Incorrect Voltage.

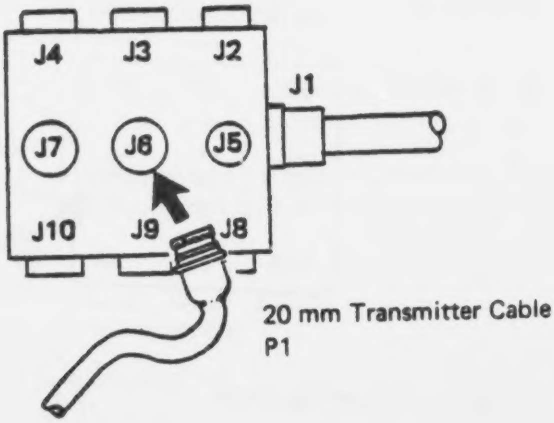
If voltage reading is 24 to 30 volts, place MASTER ARM switch to ARM position and trigger the 20 mm Transmitter Assembly using the aircraft's 20 mm weapon system. Check test set indicator lamp L1 when system is triggered.

If lamp L1 comes ON, replace defective FLASHWESS and return system to service.

If lamp L1 does not come ON, disconnect the 20 mm Transmitter Cable from test set. Reconnect it to FLASHWESS.

Disconnect 20 mm Transmitter Cable, connector P1 from Transmitter Assembly. Connect it to connector J6 on Test Set Junction Box.

Test Set Junction Box



MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Place test set switch S1 to EXT position.

Place test set switch S2 to position M.

Check voltage on test set voltmeter.

If voltage is less than 24 volts, replace defective 20 mm Transmitter Cable and return system to service.

If voltage is 24 to 30 volts, momentarily place test set switch S4 to position A. Verify FLASHWESS operates.

If FLASHWESS operates, replace defective 20 mm Transmitter Assembly and return system to service.

If FLASHWESS fails to operate, replace 20 mm Transmitter Cable and return system to service.

(1A) FLASHWESS/Incorrect Voltage

Disconnect 20 mm Transmitter Cable from Test Set Junction Box. Reconnect it to FLASHWESS.

Disconnect ALCA Interface Cable, connector P8 (Green), from 20 mm Transmitter Cable, connector P2.

Disconnect Test Set Interconnect Cable from test set.

Connect Test Set Interface Cable, connector P1, to test set, connector J1.

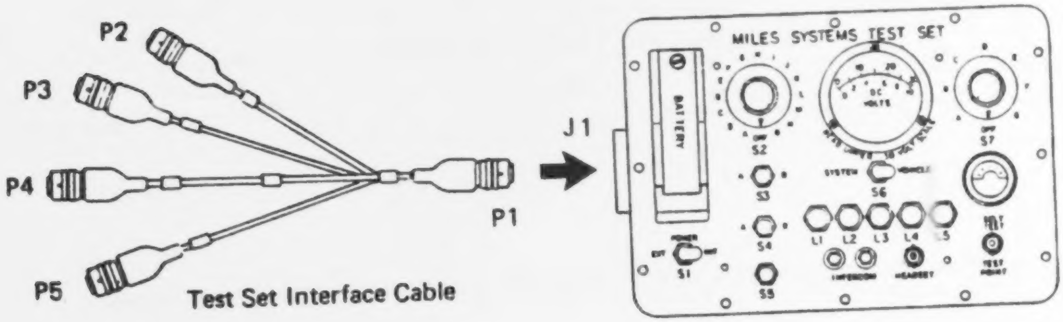

P2
P3
P4
P5
P1
Test Set Interface Cable
J1
MILES SYSTEMS TEST SET
BATTERY
DC VOLTS
S2
S3
S4
S5
S6
S7
SYSTEM
VEHICLE
POWER
EXT
S1
L1
L2
L3
L4
L5
INTERCOM
HEADSET
TEST POINT

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

8. FLASHWESS TEST (20 MM) (CONT)

(1A) FLASHWESS/Incorrect Voltage (Cont)

Place test set switch S2 to O position.

Connect ALCA Interface Cable, connector P8 (Green), to connector P3 on Test Set Interface Cable.

Read voltage on voltmeter.

If voltage reading is 24 to 30 volts, replace defective 20 mm Transmitter Cable and return system to service.

If voltage reading is less than 24 volts, locate ALCA Interface Cable, connectors P5 and P10 (Red). Disconnect cable connection to P5 (Red) and to P10 (Red).

Take cable previously connected to P5 (Red) and connect it to P10 (Red).

Read voltage on voltmeter.

If voltage reading is 24 to 30 volts, replace defective ALCA/Launcher Cable that was disconnected for previous test and return system to service.

If voltage reading is less than 24 volts, replace defective ALCA Adapter Assembly and return system to service.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

9. TOW TRANSMITTER TEST

(1) ALCA Will Not Trigger

NOTE

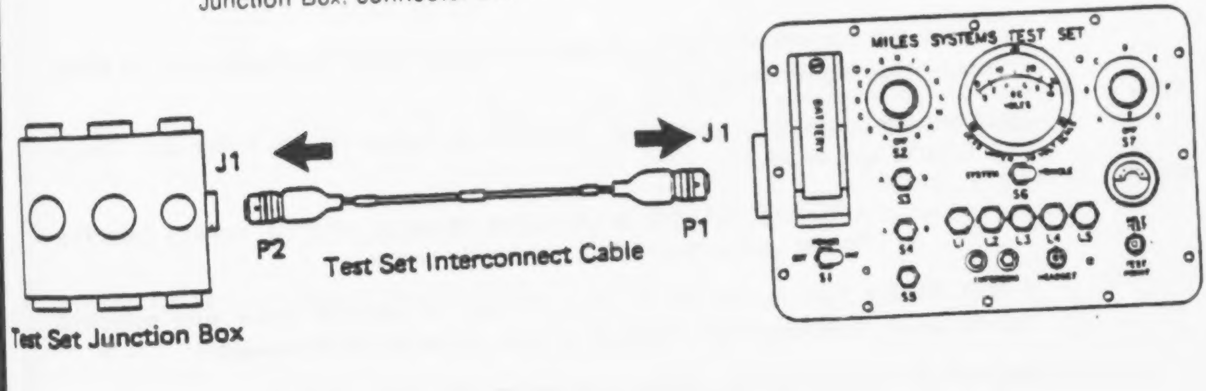
If ALCA does not respond to a Missile Fire Command from either Port or Starboard side, proceed to Step (1B) Aircraft Loaders Control Assembly (ALCA) Will Not Trigger/Both Sides.

Reset ALCA with Controller (Green) Key.

Momentarily depress TOW XMTR pushbutton on TTI of suspected nonoperational Rocket Launcher. Check NOT READY light on ALCA.

If NOT READY light is ON, go to step (1A) ALCA Will Not Trigger/Voltage Good.

If NOT READY light is not ON, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



Disconnect ALCA/Launcher Cable, connector P2 from Rocket Launcher, connector J1.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

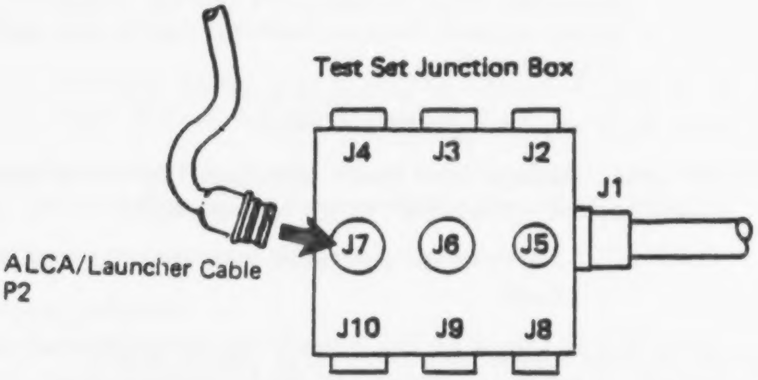
---

9. TOW TRANSMITTER TEST (CONT)

(1) ALCA Will Not Trigger (Cont)

Place test set switch S1 to EXT position.

Connect ALCA/Launcher Cable, connector P2, to connector J7 on Test Set Junction Box.



(Note that test set indicator lamps L4 and L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S7 to position E. Momentarily depress test set switch S5. Check NOT READY light on ALCA.

If NOT READY light is ON approximately 12 seconds, replace defective Rocket Launcher and return system to service.

If NOT READY light is not ON for approximately 12 seconds, make sure sufficient rounds remain to conduct test. Reset ALCA with Controller key if necessary.

Disconnect ALCA/Launcher Cable, connector P2, from Test Set Junction Box. Reconnect it to Rocket Launcher.

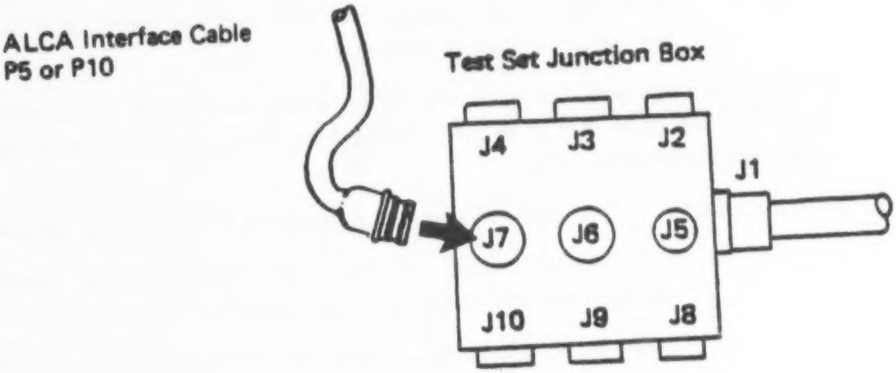
Disconnect ALCA/Launcher Cable, connector P1, from ALCA Interface Cable, connector P5 or P10 (Red).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Connect ALCA Interface Cable, connector P5 or P10 (Red), to connector J7 on Test Set Junction Box.


ALCA Interface Cable
P5 or P10
Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8

Momentarily depress test set switch S5.

Lamps L4 and L5 are ON.

Check NOT READY light on ALCA.

If NOT READY light is ON for approximately 12 seconds, replace defective ALCA/Launcher Cable and return system to service.

If NOT READY light is not ON for approximately 12 seconds, replace defective ALCA Adapter Assembly and return system to service.

(1A) ALCA Will Not Trigger/Voltage Good

Place ATWESS switch on TTI to SAFE/TSU TEST position.

Monitor AIRCRAFT TRIGGER LED on TTI as aircraft's TOW Weapon System is fired.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

9. TOW TRANSMITTER TEST (CONT)

(1A) ALCA Will Not Trigger/Voltage Good (Cont)

If TRIGGER LED flashes ON-OFF, replace defective Rocket Launcher and return system to service.

If TRIGGER LED does not flash ON-OFF, remove operational TOW Missile/Launcher Cable from opposite side of aircraft. Install it on side in question, temporarily replacing suspected inoperative cable.

Monitor AIRCRAFT TRIGGER LED on TTI, as aircraft's TOW Weapon System is fired.

If TRIGGER LED flashes ON-OFF, replace defective TOW Missile/Launcher Cable and return system to service.

If TRIGGER LED does not flash ON-OFF, repair aircraft's TOW Weapon System.

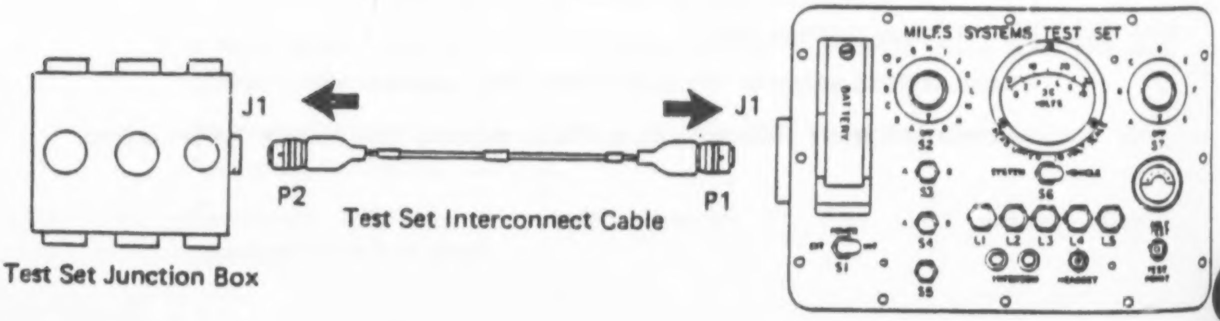
(1B) ALCA Will Not Trigger/Both Sides

Momentarily depress TOW XMTR pushbutton on either TTI.

Check NOT READY light on ALCA.

If NOT READY light is ON approximately 12 seconds, repair aircraft's TOW Weapon System.

If NOT READY light is not ON for approximately 12 seconds, connect Test Set Interconnect Cable, connector P1, to the test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



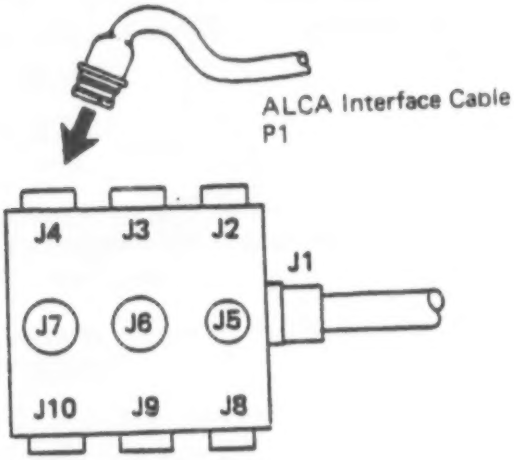
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Place test set switch S1 to EXT position.

Disconnect ALCA Interface Cable, connector P1, from ALCA. Connect it to connector J4 on Test Set Junction Box.



Test Set Junction Box

Momentarily depress TOW XMTR pushbutton on either TTI.

Check test set indicator lamp L1.

If lamp L1 flashes ON-OFF, replace defective ALCA and return system to service.

If lamp L1 does not flash ON-OFF, disconnect ALCA Interface Cable from Test Set Junction Box and reconnect to ALCA.

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Disconnect ALCA/Launcher Cable, connector P1, from ALCA Interface Cable, connector P5 or P10 (Red).

Connect ALCA Interface Cable, connector P5 or P10 (Red), whichever is now unconnected, to connector J7 on Test Set Junction Box.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

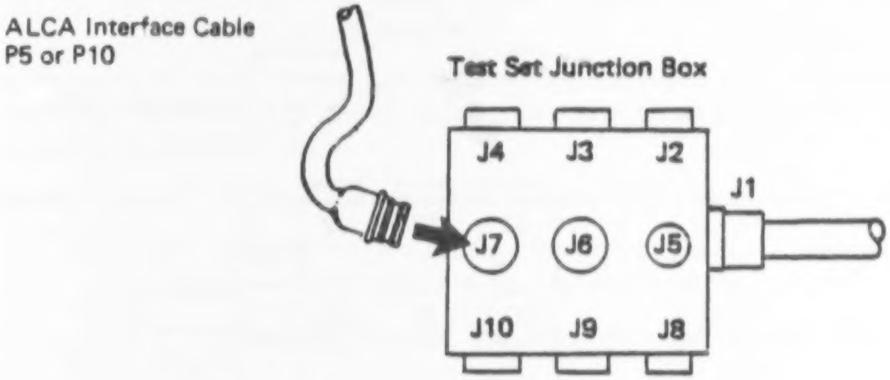
TEST OR INSPECTION

CORRECTIVE ACTION

---

9. TOW TRANSMITTER TEST (CONT)

(1B) ALCA Will Not Trigger/Both Sides Cont)



(Note that test set indicator lamps L4 and L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S6 to position E. Momentarily depress switch S5.

Check NOT READY light on ALCA.

If NOT READY light is ON approximately 12 seconds, replace defective ALCA/Launcher Cable that was previously disconnected from ALCA Interface Cable. Return system to service.

If NOT READY light does not come ON for approximately 12 seconds, disconnect opposite side ALCA/Launcher Cable, connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red).

Place test set switch S6 to position E. Momentarily depress switch S5.

Check NOT READY light on ALCA.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

If NOT READY light is ON, replace defective ALCA/Launcher Cable that was previously disconnected from ALCA Interface Cable, connector P5, or P10 (Red). Return system to service

If NOT READY light is not ON, replace defective ALCA Adapter Assembly and return system to service.

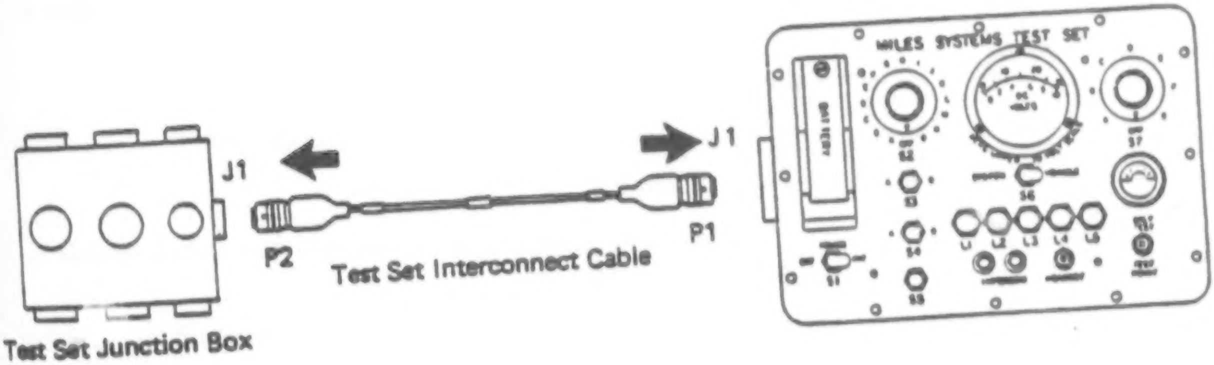
(2) Wire Cut Inoperative

NOTE

If ALCA does not respond to a wirecut command from either port or starboard side, proceed to step (2B) Wire Cut Inoperative - Both Sides.

On inoperative Rocket Launcher, disconnect ALCA/Launcher Cable, connector P2, from Rocket Launcher, connector J1.

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


MILES SYSTEMS TEST SET
J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Place test set switch S1 to EXT position.

Connect ALCA/Launcher Cable, connector P2, to connector J7 on Test Set Junction Box.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

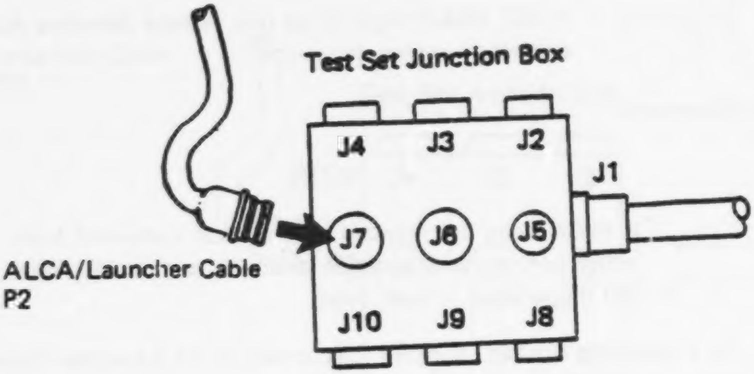
TEST OR INSPECTION

CORRECTIVE ACTION

---

9. TOW TRANSMITTER TEST (CONT)

(2) Wire Cut Inoperative (Cont)



(Note that test set indicator lamp L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S7 to position E. Depress test set switch S5. The NOT READY light on ALCA will come ON.

Place test set switch S6 to position D.

Wait 4 to 5 seconds. Then momentarily depress test set switch S5.

Check NOT READY light on ALCA.

If NOT READY light is ON, proceed to step (2A) Wire Cut Inoperative - No ALCA Light.

If NOT READY light is OFF, disconnect ALCA/Launcher Cable from Test Set Junction Box and reconnect to the Rocket Launcher.

Remove LAUNCHER ACFT TOW INTFC Cable from the opposite side of the aircraft from the inoperative launcher. Install it on the side in question, replacing the suspected inoperative cable.

Trigger ALCA using aircraft's TOW Missile System. Wait 4 to 5 seconds and initiate wire cut.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

Check NOT READY light on ALCA.

If NOT READY light is OFF, replace defective LAUNCHER ACFT TOW INTFC Cable and return system to service.

If NOT READY light is ON, checkout aircraft's TOW Missile System.

If Missile System is not operational, repair all malfunctions and return system to service.

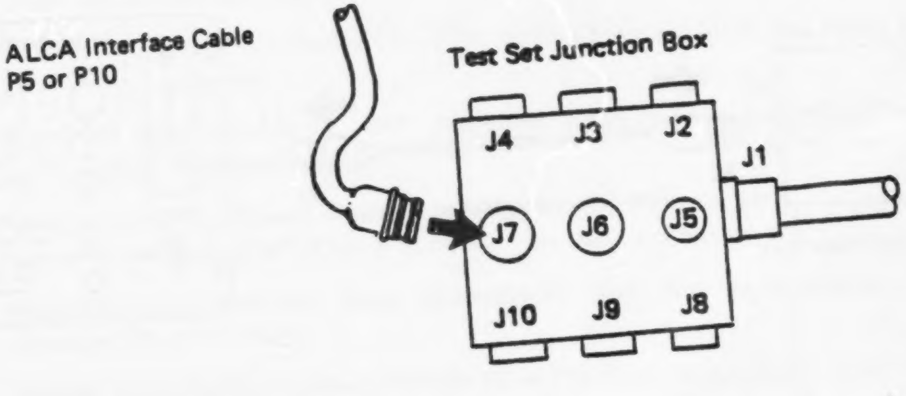
If Missile System is operational, replace MILES Rocket Launcher and return system to service.

(2A) Wire Cut Inoperative – No ALCA Light

Disconnect ALCA/Launcher Cable from Test Set Junction Box. Reconnect it to Rocket Launcher.

Disconnect ALCA/Launcher Cable, connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red).

Connect ALCA Interface Cable, connector P5 to P10 (Red), to connector J7 on Test Set Junction Box.



best copy available

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

9. TOW TRANSMITTER TEST (CONT)

(2A) Wire Cut Inoperative - No ALCA Light (Cont)

Place test set switch S6 to position E. Depress test set switch S5. NOT READY light will come ON. Lamps L4 and L5 will be ON.

Place test set switch S6 to position D.

Wait 4 to 5 seconds, then momentarily depress test set switch S5.

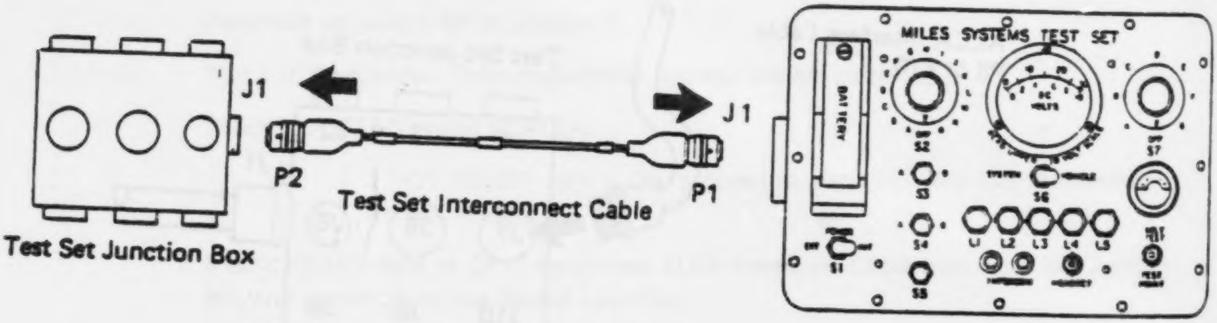
Check the NOT READY light on the ALCA.

If NOT READY light is OFF, replace defective ALCA/Launcher Cable and return system to service.

If NOT READY light is ON, replace defective ALCA Adapter Assembly and return system to service.

(2B) Wire Cut Inoperative - Both Sides

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.


J1
P2
Test Set Interconnect Cable
P1
J1
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

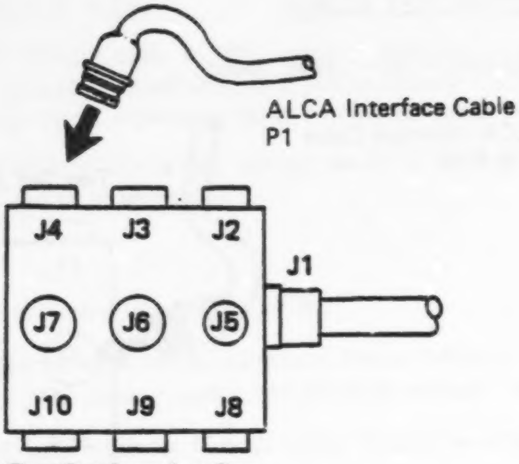
Place test set switch S1 to EXT position.

Disconnect ALCA Interface Cable, connector P1 (Red), from ALCA. Connect to connector J4 on Test Set Junction Box.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION



Test Set Junction Box

Trigger test set using aircraft's TOW Missile System. (Indicator lamp L1 will flash ON - OFF). Wait 4 to 5 seconds and initiate wirecut.

Check test set indicator lamp L2.

If lamp L2 flashes ON - OFF, replace defective ALCA and return system to service.

If lamp L2 does not flash ON - OFF, disconnect ALCA Interface Cable from Test Set Junction Box. Reconnect to ALCA.

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn key counterclockwise to CONTROLLER position. Turn back and remove key.

Disconnect ALCA/Launcher Cable, connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red).

Connect ALCA Interface Cable, connector P5 or P10 (Red), to connector J7 on Test Set Junction Box.

Table 3-2. Troubleshooting – With MSTS (Cont)

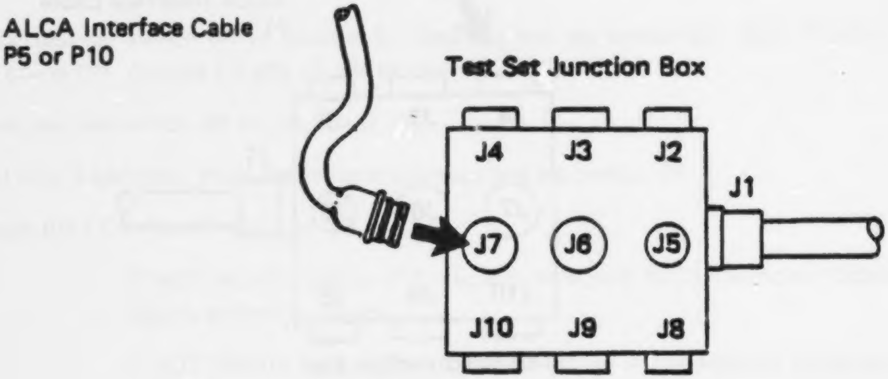
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

9. TOW TRANSMITTER TEST (CONT)

(2B) Wire Cut Inoperative – Both Sides (Cont)



(Note that test set indicator lamp L5 may be ON. This indication has no effect on troubleshooting procedures.)

Place test set switch S6 to position E. Then momentarily depress switch S5. The NOT READY light on ALCA will now be ON.

Wait 4 to 5 seconds. Place switch S6 to position D. Then momentarily depress switch S5.

Check NOT READY light on ALCA.

If NOT READY light is OFF, replace defective ALCA/Launcher Cable that was previously disconnected from ALCA Interface Cable, connector P5 or P10 (Red). Return system to service.

If NOT READY light is ON, disconnect remaining ALCA/Launcher Cable (from opposite aircraft side), connector P1 (Red), from ALCA Interface Cable, connector P5 or P10 (Red).

Place test set switch S6 to position E. Then momentarily depress switch S5. The NOT READY light on ALCA will now be ON.

Wait 4 to 5 seconds. Place switch S6 to position D. Then momentarily depress switch S5.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Check NOT READY light on ALCA.

If NOT READY light is OFF, replace defective ALCA/Launcher Cable (from opposite aircraft side), that was previously disconnected from ALCA Interface Cable, connector P5 or P10 (Red). Return system to service.

If NOT READY light is ON, replace defective ALCA Adapter Assembly and return system to service.

(3) No Laser Output

Set up Laser Alignment Control Assembly (LACA).

Aim and fire TOW laser at Multi-Range Alignment Device (MRAD) using the LACA. Fire TOW laser in both LOAD SELECT modes, L and H.

If TOW laser operates in both LOAD SELECT modes, go to step (3A) No Laser Output - Operates In Both Modes

If TOW laser fails to operate in both LOAD SELECT modes, go to step (3B) No Laser Output - Does Not Operate In Either Mode.

If TOW laser fails to operate in one LOAD SELECT mode, verify LOAD SELECT mode selected on Constraint Override Assembly (located in the Ammo Bay) is the same as selected on LACA.

If LOAD SELECT modes are the same, go to step (3A) No Laser Output - Operates In Both Modes.

If LOAD SELECT modes are different, change Constraint Override LOAD SELECT position to match LACA and return system to service.

(3A) No Laser Output - Operates In Both Modes

Disconnect LACA Cable from Adapter Cable. Reconnect it to Constraint Override-TSU Cable.

Disconnect LACA Cable, connector P2, from LACA, connector J2.

Table 3-2. Troubleshooting – With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

9. TOW TRANSMITTER TEST (CONT)

(3A) No Laser Output – Operates In Both Modes (Cont)

Disconnect Constraint Override-TSU Cable, connector P1, from Constraint Override Assembly, connector J2. Connect it to LACA, connector J2.

Aim and fire TOW laser at MRAD using LACA.

Verify TOW laser operates.

If laser fails to operate, replace defective Constraint Override-TSU Cable and return system to service.

If TOW laser operates, disconnect Constraint Override-TSU Cable from LACA. Reconnect it to Constraint Override Assembly.

Disconnect Constraint Override-TSU Cable, connector P1, from ALCA, connector J1. Connect it to LACA, connector J2.

Aim and fire TOW laser at MRAD using LACA.

NOTE

The LOAD SELECT switch on TSU Alignment Control Unit and Constraint Override Assembly must be set to the same position, L or H.

Verify TOW laser operates.

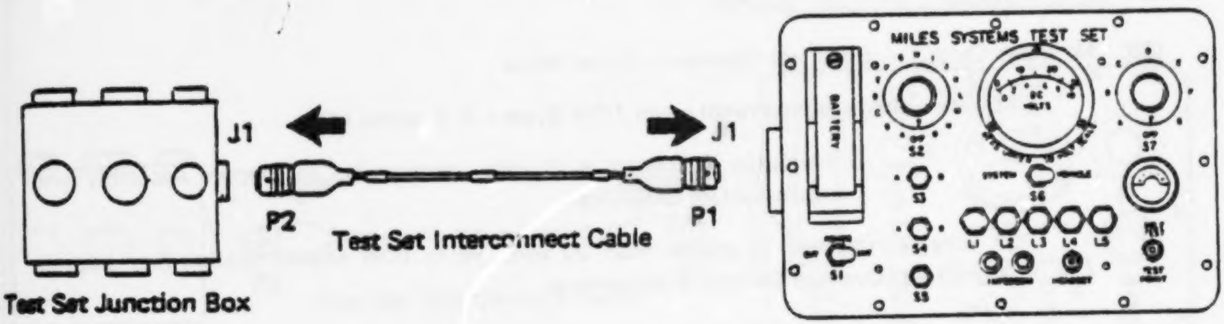
If TOW laser operates, replace defective ALCA and return system to service.

If TOW laser fails to operate, connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.

MALFUNCTION

TEST OR INSPECTION

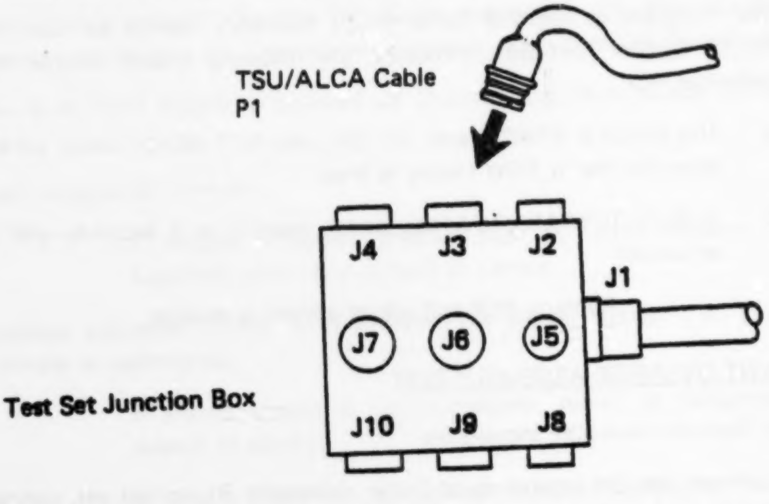
CORRECTIVE ACTION


J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
BATTERY
S2
S3
S4
S5
S6
S7
S1
SYSTEM
VEHICLE
L1
L2
L3
L4
L5

Place test set switch S2 to 0 position.

Place test set switch S6 to VEHICLE position.

Disconnect Constraint Override-TSU Cable, connector P1, from Constraint Override Assembly, connector J2. Connect it to Test Set Junction Box, connector J3.


TSU/ALCA Cable
P1
J4
J3
J2
J1
J7
J6
J5
Test Set Junction Box
J10
J9
J8

Go to (3B) No Laser Output – Does Not Operate In Either Mode.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

9. TOW TRANSMITTER TEST (CONT)

(3B) No Laser Output - Does Not Operate In Either Mode

Check voltage on voltmeter when TOW System is powered UP.

If voltage indication is 0 volts, replace ALCA Adapter Assembly and return system to service.

If voltage indication is greater than 20 volts, verify TOW Missile System (i.e., Launch Constraint Override Switch) is operational.

If Missile System is not operational, repair all malfunctions and return system to service.

If Missile System is operational, replace Constraint Override-TSU cable and return system to service.

10. PROGRAMMER CONTROL PANEL (PCP) TEST

(1) PCP Inoperative

The Programmer Control Panel (PCP) Assembly cannot be fault isolated using the MILES System Test Set. However, the following system failures indicate a possible defective PCP.

a. The MISSILE TRACK lamp, on CKI, and NOT READY lamp, on ALCA, reset 2 to 3 seconds after a TOW Missile is fired.

b. Multiple TOW Missile firings occur every 2 to 3 seconds with one TOW trigger actuation.

Replace PCP and return system to service.

11. CONSTRAINT OVERRIDE ASSEMBLY TEST

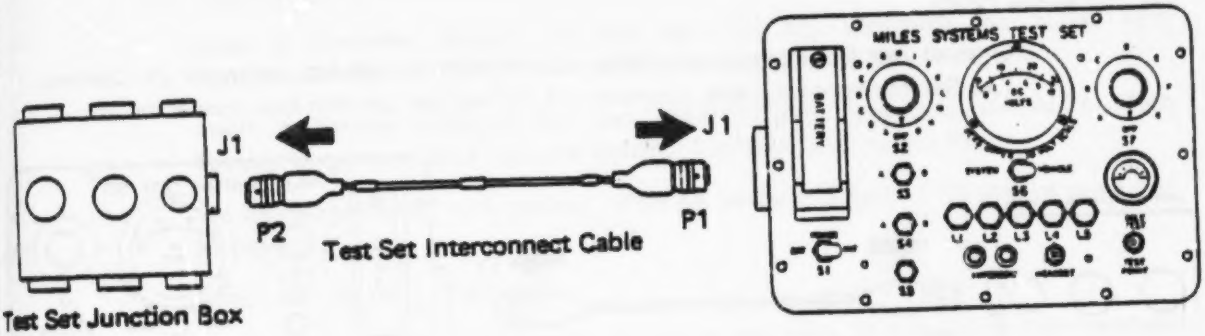
(1) Constraint Override Assembly Inoperative

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION


MILES SYSTEMS TEST SET
BATTERY
S2
S6
S7
SYSTEM
VEHICLE
S1
S3
S4
S5
L1
L2
L3
L4
L5
J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box

Place test set switch S2 to 0 position.

Place test set switch S6 to VEHICLE position.

Disconnect Constraint Override-TSU Cable, connector P1, from Constraint Override Assembly, connector J2. Connect to connector J3 on Test Set Junction Box.

Make sure TOW system is powered up. Depress aircraft's Launch Constraint Override switch.

Check voltage on voltmeter.

If voltage indicates greater than 20 volts, replace ALCA Adapter Assembly and return system to service.

If voltage indicates 0 volts, verify aircraft TOW Missile System (i.e., Launch Constraint Override) is operational.

If Missile System is not operational, repair all malfunctions and return system to service.

If Missile System is operational, replace Constraint Override-TSU Cable and return system to service.

Table 3-2. Troubleshooting – With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

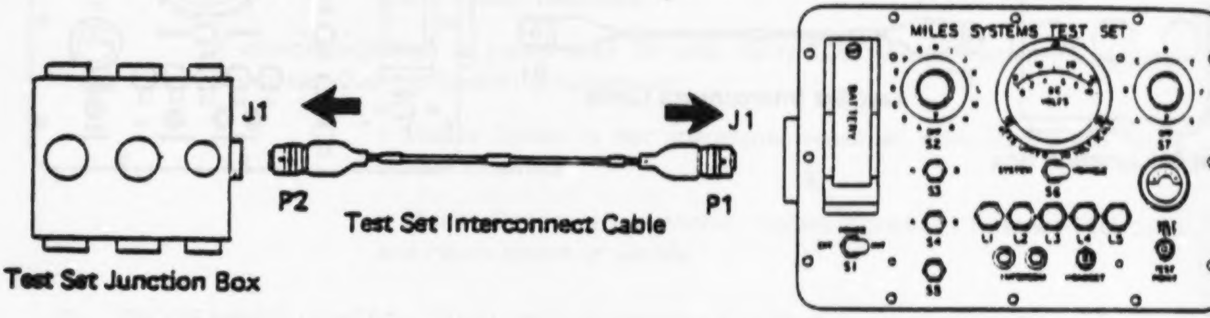
CORRECTIVE ACTION

---

12. HEADSETS

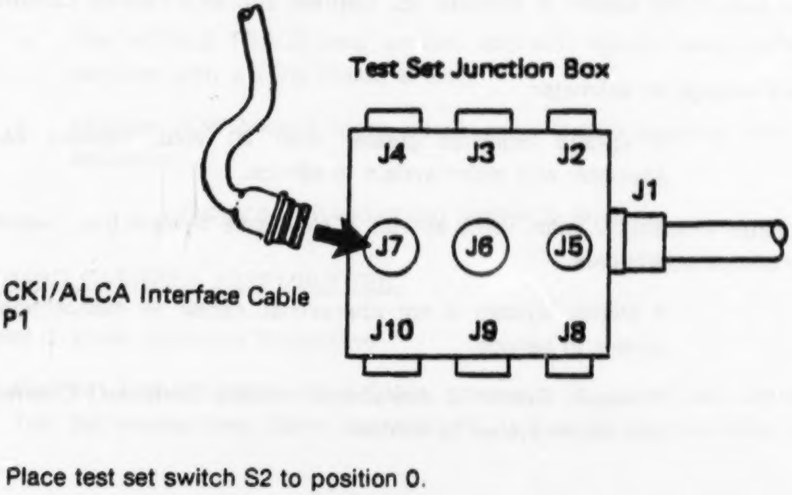
(1) Headsets Faulty

Connect Test Set Interconnect Cable, connector P1, to test set, connector J1. Connect Test Set Interconnect Cable, connector P2, to Test Set Junction Box, connector J1.



J1
J1
P2
P1
Test Set Interconnect Cable
Test Set Junction Box
MILES SYSTEMS TEST SET
S1
S2
S3
S4
S5
S6
S7
L1
L2
L3
L4
L5

Disconnect CKI-ALCA Interface Cable, connector P1, from CKI. Connect to connector J7 on Test Set Junction Box.



Test Set Junction Box
J4
J3
J2
J1
J7
J6
J5
J10
J9
J8
CKI/ALCA Interface Cable
P1

Place test set switch S2 to position 0.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

(Test set indicator lamps L2 and L4 may come ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Insert a Vehicle (Orange) Key into WEAPON key receptacle on ALCA. Turn counterclockwise to SELF KILL the system. Turn back and remove key.

Set test set switch S7 to A position. (Test set indicator lamps L1, L3 and L4 come ON, L2 flashes.)

Check test set BELT TEST meter.

If BELT TEST meter bit rate is less than 50 bits, go to (1A) Headsets Faulty – Acceptable Bit Rate.

If BELT TEST meter bit rate is greater than 50 bits, connect Headset-CKI Cable to the test set connector labeled HEADSET.

Install 9 V battery in test set.

Set test set switch S1 to INT.

Place test set switch S7 to B position and S2 to OFF. Depress test set switch S5. Listen to the aircraft's headset.

If AUDIO TONE is heard, replace defective CKI and return system to service.

If no AUDIO TONE is heard, verify aircraft's headset is operational.

If aircraft's headset is not operational, correct all malfunctions and return system to service.

If aircraft's headset is operational, replace Headset-CKI Cable and return system to service.

(1A) Headsets Faulty – Acceptable Bit Rate

Disconnect CKI-ALCA Interface Cable from Test Set Junction Box. Reconnect to CKI.

Disconnect CKI, connector P2, from ALCA Interface Cable, connector P7.

Table 3-2. Troubleshooting - With MSTS (Cont)

MALFUNCTION

TEST OR INSPECTION

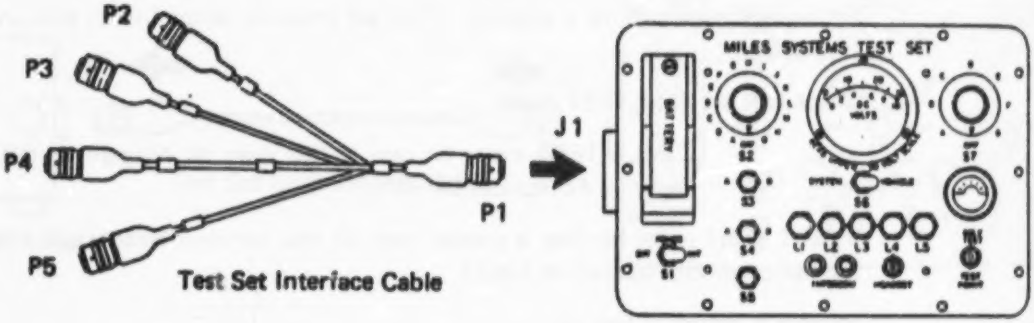
CORRECTIVE ACTION

---

12. HEADSETS

(1A) Headsets Faulty - Acceptable Bit Rate (Cont)

Disconnect Test Set Interconnect Cable from test set. Connect Test Set Interface Cable, connector P1, to test set, connector J1.



Connect ALCA Interface Cable, connector P7 (Yellow), to Test Set Interface Cable, connector P2.

Place test set switch S2 to position 0.

(Test set indicator lamp L2 and L4 may come ON. These indications have no effect on troubleshooting procedures.)

Insert a Controller (Green) Key into WEAPON key receptacle on ALCA. Turn counterclockwise to CONTROLLER position. Turn back and remove key.

Insert a Vehicle (Orange) Key into WEAPON key receptacle on ALCA. Turn clockwise to SELF KILL the system. Turn back and remove key. (Test set indicator lamps L1, L2 and L4 are ON, L3 flashes)

Check test set BELT TEST meter.

If BELT TEST meter bit rate is greater than 50 bits, replace defective CKI-ALCA Interface Cable and return system to service.

MALFUNCTION

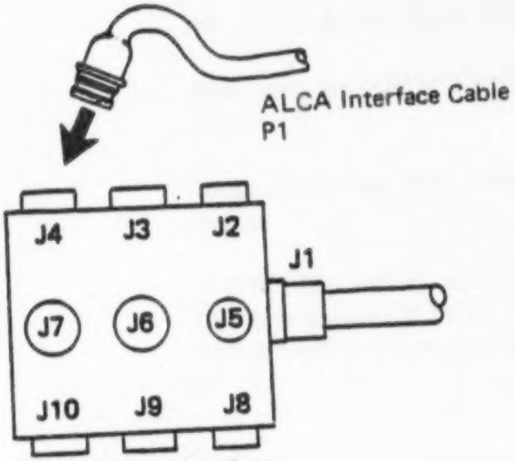
TEST OR INSPECTION

CORRECTIVE ACTION

If BELT TEST meter bit rate is less than 50 bits, disconnect ALCA Interface Cable from Test Set Interface Cable. Reconnect it to CKI Cable.

Disconnect Test Set Interconnect Cable from test set. Reconnect Test Set Interconnect Cable, connector P1, to test set, connection J1.

Disconnect ALCA Interface Cable, connector P1, from ALCA. Connect to connector J4 on Test Set Junction Box.



Test Set Junction Box

Connect Headset Cable to CKI.

Place switch S7 to position B and S2 to OFF. Depress switch S5. Listen to aircraft's headset.

If an AUDIO TONE is heard, replace defective ALCA and return system to service.

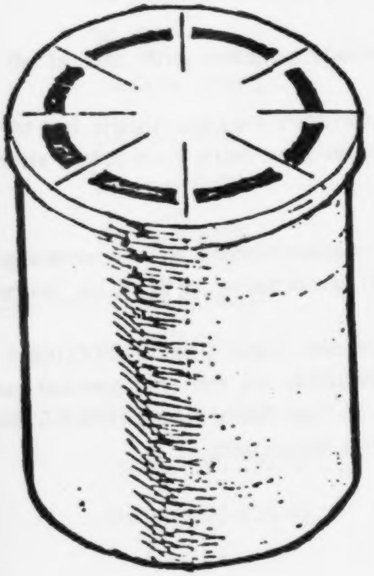
If no AUDIO TONE is heard, replace ALCA Interface Cable and return system to service.

CHAPTER 4

AMMUNITION

SECTION I. MILES AUTHORIZED AMMUNITION

The RM22 Practice Cartridge (NSN 1370-01-085-2601) and the M18 (yellow) Smoke Hand Grenade (NSN 1330-00-289-6854) are authorized for use during MILES training simulations on the AH-1S Helicopter.



ATWESS Cartridge

WARNING

Handle ATWESS cartridges with the same care you use with any live ammunition. A severe jolt to the ATWESS may cause the cartridge to go off.

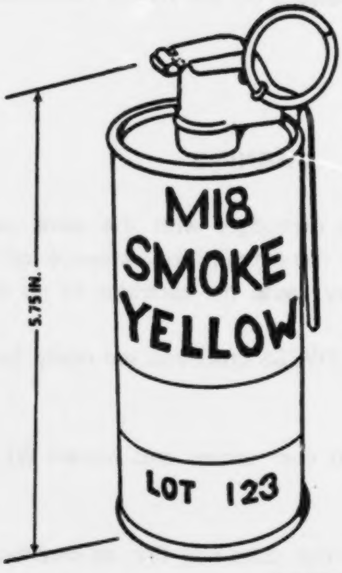
Never arm the ATWESS until you are ready for a mission.

Never place hand over armed and loaded WESS device.

If ATWESS cartridge does not fire, be sure firing device is turned off before attempting to remove. Wait 5 minutes before removing.

If cartridge has cracks, tears, punctures in copper disk, or if cartridge primer is dented, return to your NCOIC for disposal IAW local EOD procedures.

If cartridge primer is not dented after attempting to fire, the ATWESS itself has not fired. Put another cartridge in ATWESS. Return unused cartridge to storage.



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WARNINGS

Never carry hand grenades or handle them by safety pull ring attached to safety pin.

Handle grenade canisters with care at all times.

Expended canisters may be initially hot to touch. Wait 5 minutes after being fired before attempting to remove.

Dispose of malfunctioning and expended grenade canisters in accordance with EOD procedures.

The M18 Smoke Hand Grenades (Yellow) (NSN 1330-00-289-6854) are the only grenade canisters authorized to be fired during MILES training simulations on helicopters.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all Forms, Field Manuals, Technical Manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS

SF 368	Quality Deficiency Report
DA Form 2028-2	Recommended Changes to DA Publications
DA Form 2062	Hand Receipt
DA Form 2402	Exchange Tag
DA Form 2404	Equipment Inspection and Maintenance Work Sheet

A-3. FIELD MANUALS

FM 21-11	Field Manual: First Aid for Soldiers

A-4. TECHNICAL MANUALS

TM 55-1520-234-10	Operator's Manual: Army Model AH-1S (Mod.) Helicopter
TM 55-1520-236-10	Operator's Manual Army Model AH-1S (Prod), AH-1S (ECAS), and AH-1S (Modernized Cobra) Helicopters
TM 9-1055-460-13&P	2.75-Inch Aircraft Rocket Launchers, M158A, M200 and M200A1
TM 9-1090-206-12	Aviation Unit Maintenance Manual; Armament Subsystem, Helicopter
TM 9-1265-370-10-1	Operator's Manual: MILES M60 System for M16 Rifle
TM 9-1270-223-10-HR	Hand Receipt, MILES AH-1S Helicopter Weapon System

A-5. MISCELLANEOUS PUBLICATIONS

AR 310-2	Identification and Distribution of DA Publications
SB 11-6	Dry Battery Supply Data
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
CTA 50-970	Expendable/Durable Items

APPENDIX B

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

B-1. SCOPE

This appendix lists Components Of End Item (COEI) and Basic Issue Items (BII) for the MILES AH-1S Attack Helicopter System to help you inventory items required for safe and efficient operation.

B-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the MILES AH-1S Attack Helicopter System in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the MILES AH-1S Attack Helicopter System during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1) – Illustration Number. This column indicates the number of the illustration in which the item is shown.

b. Column (2) – National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

NOTE

National stock numbers (NSNs) have not been assigned to all COEI, BII, and AAL items because these items are presently supported by contractor logistics support (CLS). When decision is made to assume Government support, NSNs will be assigned, and hand receipt entries (columns a, c, d, and e) will be furnished.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

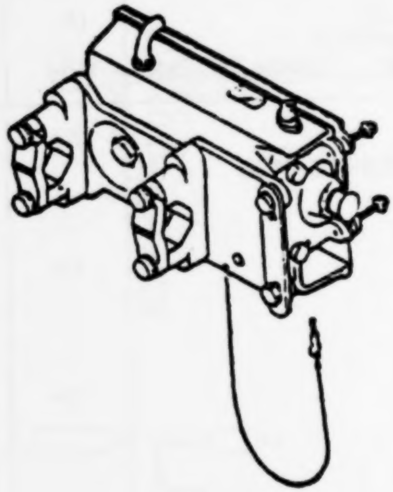
SECTION II. COMPONENTS OF END ITEM

SIMULATOR SYSTEM, FIRING, LASER: M80 FOR AH-1S HELICOPTER

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. rqr.
1	*	Adapter Assembly, 20 mm Transmitter (19200) 9339847	EA	1
2	*	Adapter Assembly, Cockpit Kill Indicator (19200) 9339399-1	EA	1
3	*	Adapter Assembly, Simulator, Weapon Fire (19200) 9339391-1	EA	1
4	*	Adapter Assembly, Simulator System, Laser: Console (19200) 9340060	EA	1
5	*	Adapter Set, Simulator System, Laser: AH-1S Helicopter (19200) 9339547	EA	1
		Line Item/Part Number 9339547 consists of the following components:		
5A	*	Bracket, Spacer Assy (19200) 9340068	EA	1
5B	*	Cable Assembly, AKI/SMOKE - ALCA INTFC (19200) 9339994	EA	1

* Not Available on Publication Date

COMPONENTS OF END ITEM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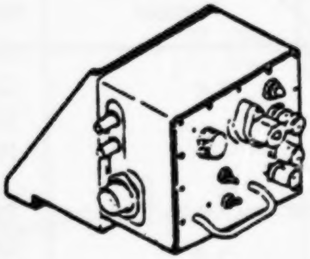
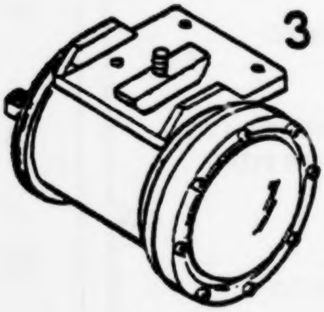

2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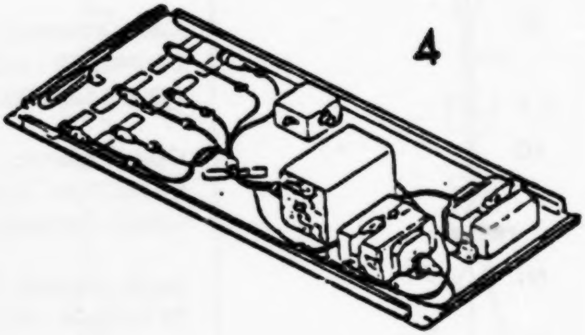
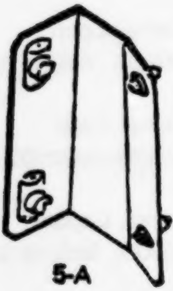

4


5-A

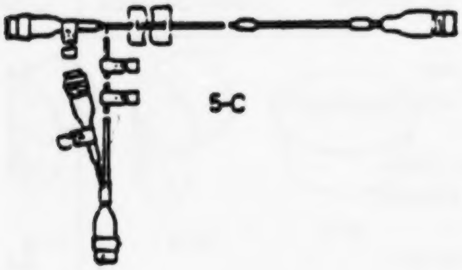
SECTION II. COMPONENTS OF END ITEM

SIMULATOR SYSTEM, FIRING, LASER: M80 FOR AH-1S HELICOPTER (CONT)

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. rqr.
5C	*	Cable Assembly, CONSTRAINTS OVERRIDE - TSU (19200) 9339992	EA	1
5D	*	Cable Assembly, CKI - ALCA INTFC (19200) 9339838	EA	1
5E	*	Cable Assembly, HEADSET - CKI (19200) 9340056-3	EA	2
5F	*	Cable Assembly, LAUNCHER - ALCA INTFC (19200) 9339800	EA	2
5G	*	Cable Assembly, LAUNCHER - TOW DETECTOR - ACFT TOW INTFC (19200) 9339598	EA	2
5H	*	Cable Assembly, SAIL DETECTOR - ALCA INTFC (19200) 9339993	EA	1
5I	*	Cable Assembly, 20 mm CANNON ALCA - INTFC - SAW - ACFT (19200) 9339797	EA	1
5J		Clamp, Loop (96906) MS21919-WCG5	EA	11
5K	5340-01-148-3722	Clamp, Loop (96906) MS21919-WCG6	EA	10
5L	*	Clamp, Loop (96906) MS21919-WCG11	EA	2

* Not Available on Publication Date

COMPONENTS OF END ITEM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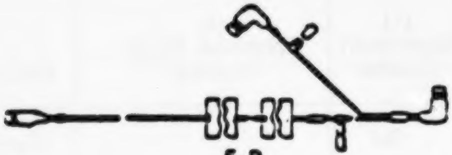
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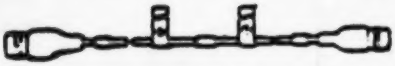
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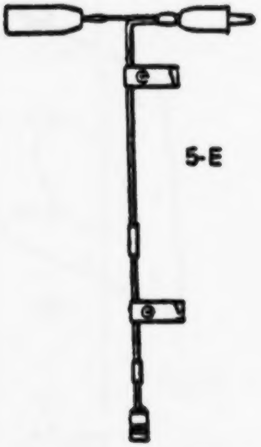
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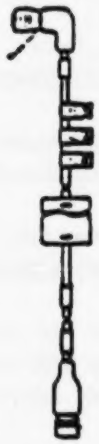
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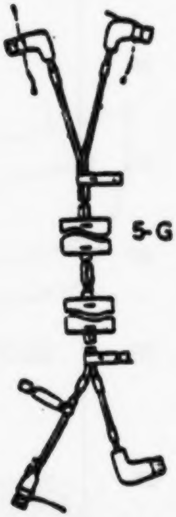
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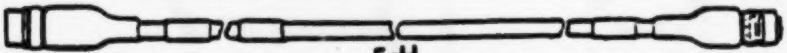
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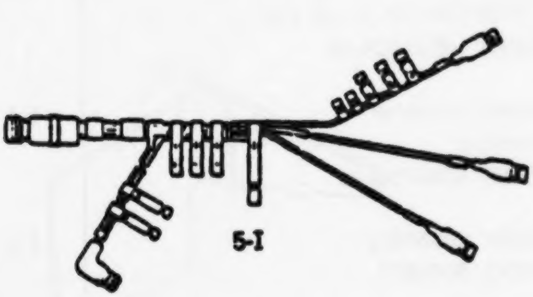
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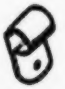
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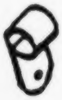
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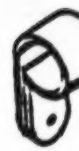
SECTION II. COMPONENTS OF END ITEM

SIMULATOR SYSTEM, FIRING, LASER: M80 FOR AH-1S HELICOPTER (CONT)

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. rqr.
5M	*	Clamp, Loop (96906) MS21919-WCG13	EA	4
5N	*	Grommet, Cable (19200) 9339921	EA	1
5O	*	Paddle, Rocket Alignment (19200) 9340075	EA	1
5P	*	Plate, Floor (19200) 9340132	EA	1
5Q	*	Plunger Assembly, (19200) 9344580	EA	1
5R	*	Retainer, Sail Detector (19200) 9339926	EA	1
5S	5305-00-054-6671	Screw, Pan Head # 8-32 UNC-2A x .625 LG (96906) MS51957-46	EA	4
5T	5305-00-059-3661	Screw, Pan Head # 10-32 UNF-2A x .750 LG (96906) MS51958-65	EA	46
5U	5305-00-059-3664	Screw, Pan Head # 10-32 UNF-2A x 1.25 LG (96906) MS51958-68	EA	8
5V		Spacer, Launcher Assembly (19200) 9344759	EA	2
5W		Adapter Assembly (19200) 9358826	EA	1

* Not Available on Publication Date

COMPONENTS OF END ITEM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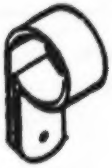
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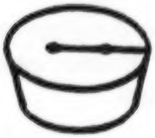
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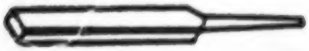
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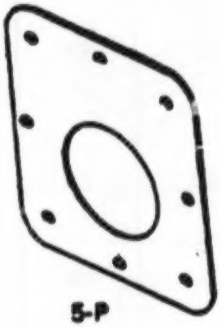
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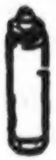
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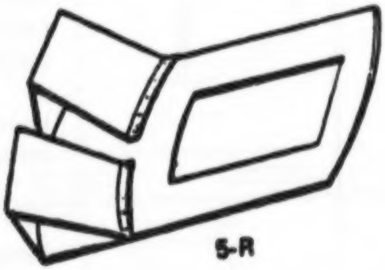
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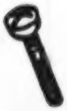
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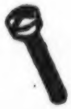
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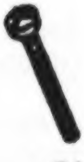
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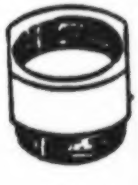
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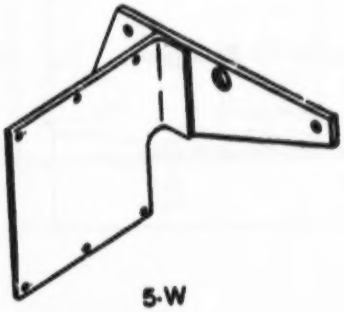
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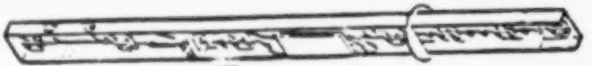
SECTION II. COMPONENTS OF END ITEM

SIMULATOR SYSTEM, FIRING, LASER: M80 FOR AH-1S HELICOPTER (CONT)

(1) Illustration Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. rqr.
6	*	Control Panel, Simulator System, Laser: TOW Program Interrupt (19200) 9339937	EA	1
7	*	Detector Assembly, TOW Launch Rack (19200) 9339537	EA	2
8	*	Detector Belt Assembly, Aircraft Segment No. 1 (19200) 9339538	EA	1
9	*	Indicator Assembly, Simulator System Laser: KILL, HIT, MISS (19200) 9339396	EA	1
10	*	Installation Kit, AH-1S Helicopter (19200) 9339415	EA	1
11	*	Launcher Assembly, Simulator System, Laser: Aircraft Weapon (19200) 9339545	EA	2
12	*	Manual, Operators	EA	1
13	*	Transit Case Assy, AH-1S Adapter (19200) 9344556	EA	1
14	*	Transit Case Assy – Detector Assy, TOW Launch Rack, AH-1S (19200) 9339568	EA	1
15	*	Transit Case Assy, AH-1S Equipment (19200) 9339603	EA	1
16	*	Transit Case Assy, AH-1S Launcher (19200) 9339560	EA	2

* Not Available on Publication Date

COMPONENTS OF END ITEM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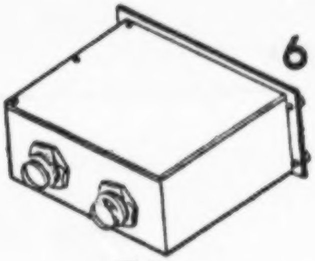
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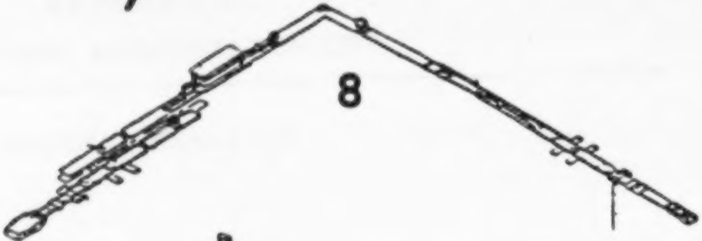
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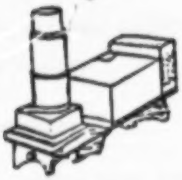
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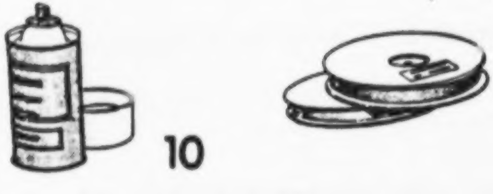
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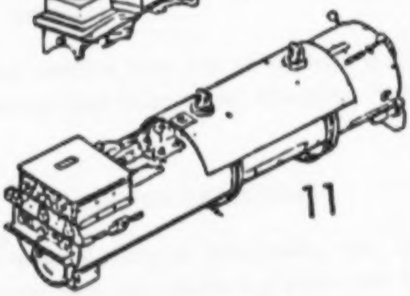
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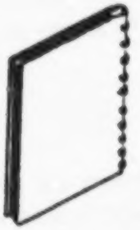
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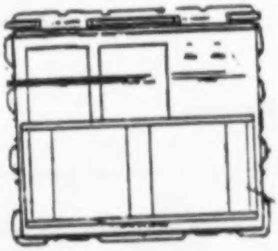
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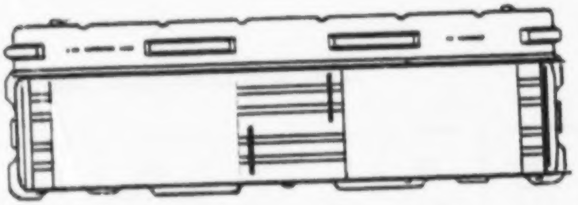
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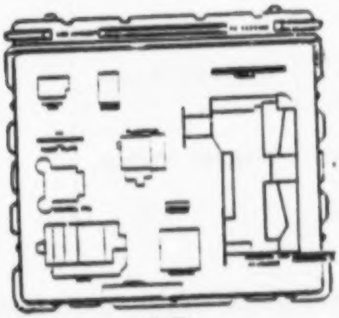
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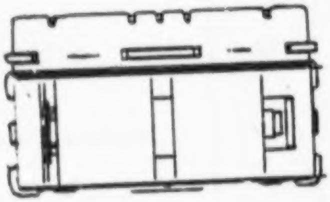
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APPENDIX C

ADDITIONAL AUTHORIZATION LIST

SECTION I. INTRODUCTION

C-1. SCOPE

This Appendix lists additional items you are authorized for the support of the MILES AH-1S Attack Helicopter System.

C-2. GENERAL

This list identifies items that do not have to accompany the MILES AH-1S Attack Helicopter System and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. These items are listed in alphabetical sequence by item name.

SECTION II. ADDITIONAL AUTHORIZATION LIST

(1) Item Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. Auth
1*	1005-01-076-8329	Adapter, Muzzle, 20 mm (19203) 11830731	EA	1
2	4931-01-064-3530	AH-1S Universal Boresight Kit (19203) 11830730	AY	1
3	5860-01-155-5478	Alignment Device, Laser Transmitter, Multiple Range (19200) 9339389	EA	1

* From AH-1S Universal Boresight Kit

SECTION II. ADDITIONAL AUTHORIZATION LIST (CONT)

(1) Item Number	(2) National Stock Number	(3) Description FSCM & Part Number Usable On Code	(4) U/M	(5) Qty. Auth
4	1217-01-159-0486	Control Assembly, Simulator System, Laser Alignment (19200) 9339939	EA	1
5	1265-01-092-0891	Controller's Gun, Simulator System, Laser (19200) 11748811	EA	1
6	1265-01-075-4893	Detector Assembly, Simulator System, Man Worn (19200) 11748808	EA	1
7	5120-00-243-9401	Hand Roller	EA	1
8		MILES System Test Set (19200) 9358870	EA	1
9*		Telescope, Boresight (05606) 125C921	EA	1

* Not Available on Publication Date

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the MILES AH-1S Attack Helicopter System. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D-2. EXPLANATION OF COLUMNS

a. Column (1) – Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material. (e.g., "Use Cleaning Compound, Item 5, Appendix D.")

b. Column (2) – Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

c. Column (3) – National Stock Number. This is the National Stock Number (NSN) assigned to the item; use it to request or requisition the item.

d. Column (4) – Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) – Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE/DURABLE SUPPLIES AND MATERIAL LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description FSCM & Part Number Usable On Code	(5) U/M
1	C, O	6135-00-643-1310	* Battery, 6 volt 80058-BA200/U	EA
2	C, O	7920-00-255-7536	Brush, Cleaning	EA
3	C, O	1370-01-085-2601	Cartridge, Sim. Launch Anti-Mis/RM22 (19200) 11749630	CA
4	C, O	9150-01-079-6124	Cleaner, Lubricant and Preservative (CLP) (91349) MIL-L-63460	OZ
5	C, O	8315-01-111-7170	Fastener Tape (19200) 11749428	YD
6	C, O	1330-00-289-6854	Grenade, Hand, Smoke, M18 (Yellow)	EA
7	C, O	6640-00-240-5851	Paper, Lens Cleaning (81349) NNN-P-40	PK
8	C, O	8010-01-040-0947	Primer, Tape (19200) 11749034	CN
9	C, O	7920-00-205-1711	Rag, wiping: Cot DDD-R-30, CL 12, GR B	LB
10	C, O	7510-00-266-6694	Tape, Masking, 3-Inch Wide (81348) PPP-T-42	YD

* Dry battery listed is used with the equipment. It will not be preshipped automatically but is to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.

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- WARNINGS

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TM 9 -1270-223-10	1 Feb 84	(MILES)Simulator System, Firing, LASER: M80 FOR AH-1S

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IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	
8	5			Line 5. Change spelling of word unitl to read until
12	1			Change the word harnesses to read harness
12	7			Change to read: Ask controller to insert his green key into the key receptacle and turn off alarm.
14	4			Delete the word it from sentence

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN SMITH SP/3 XXX-XXXX

SIGN HERE:
John Smith

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG PERFORATED LINE

TEAR ALONG PERFORATED LINE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

____

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OFFICIAL BUSINESS

Commander
US Army Armament, Munitions and Chemical Command
ATTN: DRSMC-MAS (R)
Rock Island, IL 61299

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 13 April 1987

OPERATOR'S MANUAL
FOR
MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM
(MILES)
SIMULATOR SYSTEM, FIRING, LASER: M80
FOR
AH-1S ATTACK HELICOPTER WEAPON SYSTEM
NSN 1270-01-165-6240

TM 9-1270-223-10, 9 Oct 84, is changed as follows:

1. Replace the old pages with the new pages as indicated below
2. New or changed text is indicated by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a miniature pointing hand.

Old Page	New Page
a and b	a and b
None	c/(d blank)
i/(ii blank)	i/(ii blank)
2-13 thru 2-20	2-13 thru 2-20
2-23 and 2-24	2-23 and 2-24
2-29 thru 2-32	2-29 thru 2-32
2-47 and 2-48	2-47 and 2-48
2-51 thru 2-54	2-51 thru 2-54
2-63 thru 2-70	2-63 thru 2-70
2-75 thru 2-82	2-75 thru 2-82
2-85 and 2-86	2-85 and 2-86
2-91 and 2-92	2-91 and 2-92
2-95 thru 2-98	2-95 and 2-98
2-101 and 2-102	2-101 and 2-102
2-111 thru 2-114	2-111 thru 2-114
2-117 and 2-118	2-117 and 2-118
2-121 and 2-122	2-121 and 2-122
2-135 and 2-136	2-135 and 2-136
2-143 and 2-144	2-143 and 2-144
2-153 and 2-154	2-153 and 2-154
B-3 thru B-8	B-3 thru B-8
Index-3/(Index-4 blank)	Index-3/(Index-4 blank)

File this change sheet in back of the publication for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

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By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

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Major General, United States Army,
The Adjutant General.

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[illegible]

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

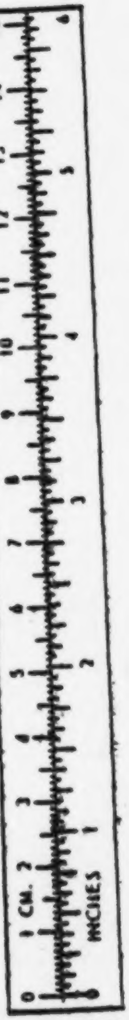
1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9(^{\circ}F - 32) = ^{\circ}C$
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
$9/5\,C^{\circ} + 32 = F^{\circ}$



TA089991

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621